



NATURAL HISTORY
SURVEY

THE LAND SNAIL
GENUS AMPHIDROMUS

A SYNOPTIC CATALOGUE

FRANK FORTESCUE LAIDLAW

AND

ALAN SOLEM

NATURAL HISTORY SURVEY

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The Land Snail Genus *Amphidromus*

INTRODUCTION

Amphidromus, a genus of arboreal pulmonate land snails belonging to the sigmurethran family Camaenidae, is found from the Garo and Khasi Hills of Assam throughout Burma, Malaya, Thailand, Laos, Cambodia, North and South Viet Nam, Indonesia as far east as the Celebes, Banda Islands, Timor and the Tenimber Islands (but not on Ceram, Buru, Halmahera, Batjan Island, the Obi Islands, the Aru and Kei Islands, or the Talaud Archipelago and some Celebesian satellite islands), and in the southern Philippine Islands, notably Mindanao and the Balabac-Palawan chain. The shells of *Amphidromus* are relatively large, from one to three inches high, and colorful. Most specimens in collections have been brought back by travelers or explorers. Comparatively little material has been gathered by malacologists.

This study attempts two things: (1) To present a check list of all nomenclatural units, varietal as well as specific and subspecific, which have been applied to specimens of *Amphidromus*, together with information on the location of type specimens, the known distribution of the named forms, and their probable systematic position. (2) To formulate an annotated synoptic list of the species of *Amphidromus*, with notes on their affinities and variations. Materials currently available to scientists are inadequate to allow preparation of a definitive monograph, but they do permit us to assemble a series of critical notes on puzzling forms and to suggest the realignment of species that is proposed below.

The senior author started this study many years ago, prepared the bulk of the alphabetical list, and is responsible for most of the systematic arrangement of the species. The junior author rechecked, edited, and added to the citations of literature, slightly altered the species arrangements on the basis of material examined in North American museum collections, and wrote the species accounts, using notes supplied by the senior author and additional information from specimens in museum collections. The resulting manuscript reflects

the views of both authors. The revised treatment of the Philippine Island *Amphidromus*, based on a new evaluation of collections in the United States National Museum and Chicago Natural History Museum, is the only portion written primarily by the junior author. The synoptic collection of *Amphidromus* that the senior author gradually accumulated is now deposited at Chicago Natural History Museum. References in the text to Chicago Natural History Museum catalogue numbers 72353 through 72436 refer to specimens from the F. F. Laidlaw collection.

Detailed notes are included below on material in Chicago Natural History Museum. Specimens in major eastern American museums were inspected, but references below include only material not duplicated by specimens in Chicago Natural History Museum. Several institutions had received specimens from the same source, and little would be added to this study by including long lists of specimens examined.

For convenience, reference to lots examined is indicated by a series of abbreviations. The abbreviations for the institution where a particular set is deposited are as follows:

AMNH	American Museum of Natural History
ANSP	Academy of Natural Sciences, Philadelphia
CM	Carnegie Museum
CNHM	Chicago Natural History Museum
MCZ	Museum of Comparative Zoology
USNM	United States National Museum

In seeking information about specimens and the location of holotypes, both authors wish to acknowledge the unstinted help of many people. Perhaps first, a word of thanks to the late Henry A. Pilsbry and Hugh Fulton who, many years ago, provided helpful advice and many specimens to the senior author when he first began this study. The authorities of the British Museum (Natural History) and particularly the late Guy Wilkins and Mr. S. P. Dance of the Museum staff allowed full use of their magnificent collection and provided detailed notes about many important type specimens. Dr. C. O. van Regteren Altena of the Rijksmuseum van Natuurlijke Historie, Leiden, freely lent many sets of specimens for examination and provided illustrations of several holotypes, as did Dr. L. Forcart of the Naturhistorisches Museum, Basel. Dr. J. M. Gaillard of the Musée National d'Histoire Naturelle, Paris, kindly sent lists and photographs of material in the Museum collection and notes on types in the collection of the *Journal de Conchyliologie*. Dr. A. Zilch of the Senckenberg

Museum, Frankfurt; Dr. H. Burla of the Zoologisches Museum der Universität, Zürich; Dr. Siegfried Jaeckel of the Zoologisches Museum der Humboldt Universität, Berlin; Dr. G. Mermod of Geneva; Dr. B. Hubendick of Göteborg; Dr. G. Thorsen of Copenhagen; Dr. E. Tortonese of the Museo Civico di Storia Naturale, Genova; and the late Dr. L. A. C. Venmans, Dr. D. F. McMichael, Mr. Richard I. Johnson, and Mr. L. E. Butot provided important data or lent specimens for study. Mrs. W. F. F. van Benthem Jutting van der Feen of the Zoologisch Museum, Amsterdam, freely shared her detailed knowledge of the Malayan and Indonesian fauna in correspondence. For facilitating his inspections of material in museums in North America, the junior author wishes to acknowledge the aid of Dr. Harald A. Rehder of the United States National Museum; Dr. William K. Emerson of the American Museum of Natural History; Dr. R. Tucker Abbott of the Academy of Natural Sciences of Philadelphia; Drs. William J. Clench and Ruth Turner of the Museum of Comparative Zoology, Harvard; and Mr. Juan José Parodíz of the Carnegie Museum, Pittsburgh.

Finally, we wish to thank Miss Sandra Schroeder for long hours spent in checking citations of literature for accuracy and Mrs. Barbara Solem for the tedious job of typing and retyping manuscript.

Previous Studies

The shells of *Amphidromus* are relatively large and colorful and were among the first Indonesian land snails brought back to Europe. Several species and varieties were described before 1800, generally with inadequate locality data. At least two—*Amphidromus (Syndromus) laevis* (Müller, 1774) and the *aureus* Martyn, 1784 variation of *Amphidromus (A.) perversus* (Linné, 1758)—still have not been reported from a precise locality.

Many species and varieties were named during the first half of the nineteenth century, again usually with poor locality data. Not until von Martens' (1867) publication was there an effort to deal with the entire complex. This paper showed an amazing grasp of variation and problems of geographic distribution, and many of von Martens' concepts are still utilized. Fulton (1896) organized 142 specific and varietal names into eighteen species groups with 64 species. When the monograph of Pilsbry (1900) appeared, the number of species had increased to 81, which were placed in nineteen groups. Pilsbry's

study remains the only illustrated monograph of the genus, and it is still indispensable for any serious study.

Since 1900, the major taxonomic studies on *Amphidromus* have been faunistic in scope. The papers of Bartsch (1917, 1918, 1919) on the Philippine species, Rensch (1932) on the Lesser Sunda Island forms, and van Benthem Jutting (1950, 1959) on Javan and Sumatran populations are especially comprehensive. Potentially the most valuable contribution is that of Haniel (1921), who discussed the variation of *Amphidromus contrarius* and *A. reflexilabris* on Timor. Variations in color and form were well illustrated in a series of color plates. Many of our conclusions concerning the relationships of color forms described as species are taken not as much from new collections as from the extent of variation found by Haniel (1921) in his pioneer study. Zilch (1953) listed type specimens in the Senckenberg Museum and illustrated many previously unfigured species.

The literature contains many scattered descriptions of new color forms and subspecies that appeared after 1900. Of the 309 names in the nomenclatural list, 111 (35.9 per cent) were published after Pilsbry (1900). We recognize 74 species by name and consider that material from the Banda Islands (see p. 573) probably represents an undescribed species. There are eleven species recognized below that were described after the appearance of Pilsbry's monograph. Several species recognized by Pilsbry we have subordinated to subspecific or varietal status, and a few names have been transferred to *incertae sedis*, since they are based on hundred-year-old references that have not been substantiated by more recent collectors.

This study thus forms a supplement to Pilsbry's monograph and is intended to be used in conjunction with his extensive plates to facilitate identifications.

Systematic Affinities

SHELL STRUCTURE

Basically, *Amphidromus* has an elongate conic or ovate conic helicoid shell of 5 to 8 whorls. The shell may be thin and fragile or very heavy and solid with no known correlation of shell structure with distribution or habitats. In some species the shell coils invariably to the right, and in many others just as invariably to the left. A significant number of species are amphidromine. That is, both left- and right-handed coiling are found in the same population, sometimes in approximately equal numbers, other times with a distinct predominance of one phase.

Sinistral mutants of normally dextral species and dextral mutants of normally sinistral species are rare but well documented occurrences among land snails. Populations or species with *normally* mixed coiling are much rarer, and, so far as we are aware, are confined, with one exception, to a few genera of arboreal tropical snails. Besides *Amphidromus*, the Cuban *Liguus (Liguellus) vittatus* (Swainson), Haitian *Liguus (L.) virgineus* (Linné) (Sigmurethra, Bulimulidae), some Hawaiian *Partulina* and many Hawaiian *Achatinella* (Orthurethra, Achatinellidae), and several species of Pacific Island *Partula* (Orthurethra, Partulidae), are known to have mixed dextral-sinistral populations. The independent appearance of this variation in unrelated groups is probably the result of a simple mutation, whose primary import is with physiological adaptations to arboreal life and not with the direction of coiling. In *Partula* both dextral and sinistral embryos have been recovered from the same brood pouch although normally all embryos coil in the same direction. In *Amphidromus* we have no information on the heredity of this character.

A possible exception may concern some of the European clausiliids of the subfamily Alopiinae. They are obligatory calciphiles living in isolated colonies on limestone outcrops. Several sets of species differ only in the direction of coiling, but the evidence is inconclusive as to whether left- and right-handed shells live together. Soós (1928, pp. 372-385) summarized previous discussions of the problem and concluded that the right- and left-handed populations were distinct species. Others have stated that these populations were not distinct, and the question is far from settled. The Peruvian clausiliid, *Nenia callistoglypta* Pilsbry (1949, pp. 216-217), also has been described as being an amphidromine species.

The genetics of reverse coiling in a rare dextral mutant of another clausiliid, *Laciniaria biplicata* (Montagu), has been studied by Degner (1952). The mechanism is the same as in *Limnaea peregra* (Müller), with the direction of coiling determined by a simple Mendelian recessive. Any change in direction caused by cross-fertilization is delayed one generation by an unknown mechanism.

There is no certainty that the same type of mechanism controls coiling direction in normally amphidromine genera. The phenomenon does offer an excellent opportunity for some Asian naturalist, since many of the most abundant species of *Amphidromus* have mixed populations in regard to coiling.

The whorls of *Amphidromus* are moderately convex and, with few exceptions, smooth or with only a faint sculpture of growth lines.

At least four separate times, however, a sculpture of moderately heavy oblique radial ribs has appeared (*A. costifer* Smith from Annam, *A. begini* Morlet from Cambodia, *A. beccarii* Tapparone-Canefri from Celebes, and the *A. palaceus*-*A. winteri* complex from Java and Sumatra). Correlated with the ribbing is light, monochrome coloration, thin shell with large aperture, and flaring lip. Many solid shells show a slight roughening of the surface, but this is quite different from the ribbed sculpture mentioned above.

The aperture is generally large and varies from about two-fifths to one-third the height of the shell, often in the same population. Usually the lip is at least somewhat expanded, and in forms such as *A. reflexilabris* Schepman and *A. winteri* (Pfeiffer) var. *inauris* Fulton, the lip can only be called flaring. In *A. perversus* (Linné) and most other thick-shelled species, the lip is internally thickened, forms a "roll" in its expansion, and has a very heavy parietal callus. In thin-shelled species, the lip is usually a simple reflected edge. The umbilical area may be partially open, nearly closed or sealed. This sometimes provides a handy criterion for specific identification. The angle of the parietal wall varies, but no precise information on this has been compiled.

Generally the whorls increase rather regularly in size, but probably related species such as *A. sinistralis* (Reeve) and *A. beccarii* Tapparone-Canefri can have quite different degrees of whorl increment (see figs. 29, 31). No attempt has been made to express these differences meristically, since most of the available material was inadequate for statistical treatment (but see Haniel, 1921). Actual dimensions vary greatly both within and between species. Minimum adult size is about 21 mm. high, the observed maximum about 75 mm. Only a few species, notably *A. maculiferus*, *A. sinensis* and *A. entobaptus*, seem to have a range in adult size of more than seven or eight millimeters.

The major shell variation is found in the color pattern. Most arboreal snails are brightly colored, the bulimulid genera *Drymaeus* and *Liguus*, cepolid *Polymita*, and the camaenid *Papuina* being obvious examples. *Polymita*, *Liguus* and *Amphidromus* are noted for their color variations.

Little is known about the control of pigment patterns in Mollusca. Comfort (1951) summarized previous work, and one of his paragraphs (p. 286) is particularly applicable:

The patterning of shells is a graphical representation, in time, of secretory activity along a line of cells, the mantle edge. The ground-colour is produced by

the whole line; banding by the special activity of groups of cells, often sharply localized. Where the activity of these groups is cyclical, blotching results: where the active focus moves up and down the mantle edge, or where activity spreads from a focus, zigzag or hollow V-shaped patterns result. . . . The intensity of the pigmentation varies with the growth rate, periods of diapause giving rise very often to darker varices, and periods of rapid growth to paler zones.

We have had neither enough time nor enough material to attempt to analyze the color patterns of *Amphidromus*, and so we are confining ourselves to a few general statements.

The basic ground color of *Amphidromus* seems to be yellow and is usually (except for *A. entobaptus*) confined to the surface layers of the shell, since worn specimens appear to be nearly devoid of color. Many species are whitish, and a few have dark ground colors. The apical whorls are pale, purple, brown, or black; they sometimes vary within a population (*A. quadrasi*). A few species, for example, *A. schomburgki*, have a deciduous green periderm. Continuous zonal patterns can take the form of whitish subsutural bands (*A. similis*), heavy subperipheral pigmentation (*A. perversus* var. *infraviridis*), subsutural color lines (*A. columellaris*), broad spiral color bands (*A. metableetus*, *A. webbi*), or narrow spiral bands (*A. laevus*). Interrupted zonation can be the interruption of bands into spots (*A. maculatus*), highly irregular splitting of zones (*A. perversus* vars. *sultanus* and *interruptus*), formation of oblique radial streaks which can parallel (*A. inversus*) or cross (*A. latestrigatus*) the incremental growth lines, or almost every conceivable combination and variation of these factors. Often the pattern will change radically from the apex to the body whorl (*A. quadrasi* vars.). Aperture, parietal callus, columella, lip, and umbilical region are variously marked with pink, brown, purple, white, or black. Haniel (1921) has several color plates which show effectively the extent of color variation within two species of the *Syndromus* type. *A. perversus* and *A. maculiferus* of the *Amphidromus* series are equally variable, while species such as *A. inversus* and *A. similis* are almost uniform in coloration.

Most of the *Amphidromus* series show resting stages by the deposition of a brown or black radial band called a varix. This is apparently rare in the *Syndromus* series, although *Amphidromus laevus* shows evidence of interruption of the spiral banding after a resting phase.

Species recognition is based on combinations of minor structural variations in the shape, aperture, whorl contour, umbilical region,

and color pattern. Apparently, many species have a stable color pattern, while others seem to vary tremendously. Adequate unselected field samples will enable a better understanding of the relative stability or variability of particular species in single localities.

SOFT PARTS

Information concerning the soft anatomy of *Amphidromus* is widely scattered and fragmentary. The most complete account is that of Jacobi (1895) on specimens from Bunguran, Natuna Islands and Djemadja, Anamba Islands. Unfortunately, although anatomical differences between the two species existed, we have no idea which forms he was dissecting, since, of the two names he used in his paper, *A. chloris* is found only in the Philippine Islands and the *interrup-tus* phase of *A. perversus* is not known from the Natuna Islands. Wiegmann (1893, 1898) discussed portions of the anatomy of *A. adamsii*, *A. porcellanus*, *A. contrarius*, and *A. sinistralis*; Collinge (1901, 1902) briefly noted features of *A. palaceus* and *A. perakensis* (reported as *A. perversus*); Haniel (1921) dissected *A. contrarius* and *A. reflexilabris*; and Rensch published a few scattered notes in his various faunistic surveys. A few earlier notes are mentioned in Pilsbry (1900).

The long, narrow kidney with reflexed ureter and closed secondary ureter, the penial complex with distinct penis, epiphallus, vas deferens and flagellum, and the basic condition of the nervous and retractor muscle systems all serve to place *Amphidromus* in the Camaenidae (=Pleurodontidae of authors). Apparently, specific differences exist in the penial complex, but present data are insufficient to allow any recognition of species groups through anatomical characters. No anatomical material could be examined for this study.

FIG. 15. A. *Amphidromus similis* Pilsbry; holotype. Mount Dadap, Borneo; collected by Moret. Rijksmuseum van Natuurlijke Historie, Leiden. B. *A. perversus butoti*, new subsp.; holotype. Bajutan, Kangean Island; collected by Hoogerwerf on August 20, 1954. Zoologisch Museum, Amsterdam. C. *A. perversus butoti*, new subsp. (same data as B); paratype showing *infraviridis* color pattern. Zoologisch Museum, Amsterdam.

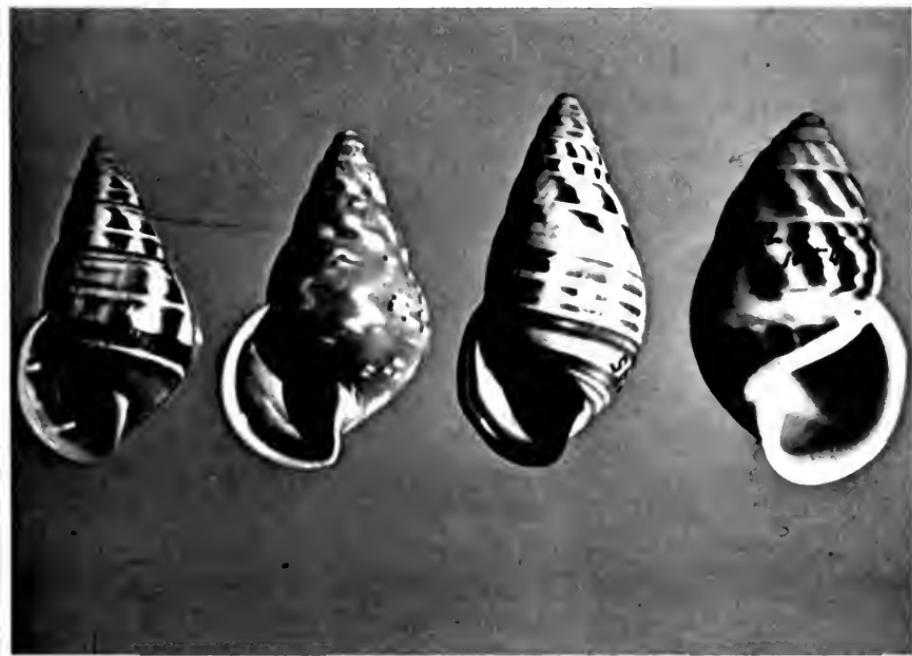
FIG. 16. A. *Amphidromus poecilochroa* Fulton. Sumbawa Island. CNHM 72394 ex Laidlaw, Fulton. B. *A. coeruleus* Clench and Archer. Baram River, Borneo. CNHM 72371 ex Laidlaw. C. *A. floresianus* Fulton. South Flores. CNHM 72395 ex Laidlaw, Fulton. D. *A. perversus butoti*, new subsp.; paratype showing *sultanicus* color pattern. Batupitih, Kangean Island; collected by Hoogerwerf. Zoologisch Museum, Amsterdam.



A

B

C



A

B

C

D

DEFINITION OF AMPHIDROMUS

The genus may be characterized as follows: Brightly colored, elongate conic shells, dextral or sinistral, one to three inches high with 5 to 8 whorls which increase regularly in size. Aperture sublunate or auriform, without teeth or folds, height two-fifths to one-third that of shell. Peristome expanded and reflected, sometimes thickened. Parietal callus weak to well-developed. Umbilicus open or closed. Color pattern monochrome to variegated. Jaw thin and weak with low flat ribs. Radula with cusped teeth arranged in V-shaped rows and modified in typical arboreal pattern. Pallial region sigmoid with very long, narrow kidney. Genitalia camaenid, with long seminal receptacle, and short penis with low insertion of retractor muscle. Habitat arboreal.

RELATED GENERA

Prior to 1900 the similarity in shape to the South American tree snails had led people to associate *Amphidromus* with the Bulimulidae. The dissections made by Wiegmann and Jacobi clearly showed that the anatomical features were those of the Asian-Indonesian camaenids and that the shell resemblance to bulimulids was a parallelism.

The most nearly analogous genus is the *Papuina* complex, which is found from the Moluccas and New Guinea to the Solomon Islands and Queensland. In recent years this complex has been split into many generic units, but in a broad use of the name, shells of *Papuina* type probably are the ecological equivalent of *Amphidromus*. The two generic groupings certainly are geographic replacements. There are no authenticated records of *Amphidromus* and *Papuina* types living on the same island. On the islands just east of the distributional limit of *Amphidromus* (Aru Islands, Halmahera, Obi, Batjan, Ternate) *Papuina* is found. Apparently Buru, Ceram(?) and the Kei Islands lack both *Papuina* and *Amphidromus*.

The shell of papuinids is generally globosely helicoid to depressed helicoid, while that of *Amphidromus* is elongate-conic. Most papuinids have the epiphallus flagellum on the male genitalia absent or rudimentary, while in most *Amphidromus* it is moderately well developed. Variation in genital anatomy within the two groups is too little known to suggest adequate anatomical distinctions, but the constant shell differences immediately separate an *Amphidromus* from a papuinid. Radulae and jaws are similar, reflecting adaptations to the arboreal habitat.

Two genera, *Beddomea* and *Pseudopartula*, are sometimes listed as subgenera of *Amphidromus*. *Beddomea* from southern India and Ceylon (see Gude, 1914, pp. 185-192) is almost certainly an off-shoot of *Amphidromus*, but it merits full generic rank. *Beddomea* has the right ocular retractor muscle passing to the right of, instead of through, the penioviducal angle as in *Amphidromus*, and the radular cusps are broadly rounded and simple instead of being tricuspid. The shell is less highly colored and is punctulate on the spire instead of being smooth. These differences were originally thought to be of subgeneric importance, but the more restricted standards of today demand generic separation.

Pseudopartula is rather puzzling. It is known only from Sumatra, Java, Nusa Kambangan, Madura, and Pulau Panaitan (see van Benthem Jutting, 1950, pp. 497-499, and Butot, 1955, pp. 129-132), but it contains a few species resembling the New Caledonian *Draparnaudia* (*Pseudopartula arborescens* Butot) or a miniature *Syndromus* (*Pseudopartula galericum gedeana* Pilsbry). It is much smaller (11-21 mm. high) than *Amphidromus* and there are differences in radula and genitalia. The latter apparently lack an epiphalllic flagellum and the epiphallus is not clearly differentiated (see Butot, 1955, p. 129, fig. 31). The penis is very slender and the seminal receptacle extremely long. The radular teeth are bluntly rounded, as in *Beddomea*, but the marginals show a very peculiar tri-lobed shape (op. cit., p. 129, fig. 32). *Pseudopartula* obviously differs from *Amphidromus* and *Beddomea*, but available data are inadequate to determine its exact affinities.

One other genus requires comment. *Ariophantopsis* Rensch (1930, pp. 181-187, figs. 1-3) was compared to *Amphidromus* and *Pseudopartula* because of similarities in radular cusp structure. This is the most variable feature of molluscan radulae; the structure of the basal portion is much more conservative and is quite useful in determining affinities. Arboreal snails almost invariably have radulae with broad, gouge-shaped cusps, and the cusp similarity of *Ariophantopsis*, *Amphidromus*, *Pseudopartula* and *Sasakina*, a dyakinine helicarionid also mentioned by Rensch (loc. cit.), does not in itself imply phylogenetic affinities. Both *Sasakina* and *Ariophantopsis* have long slender basal plates for the lateral radular teeth, while *Amphidromus* and *Pseudopartula* have short basal plates. The former are characteristic of the Helicarionidae and the latter of the Camænidae. On the basis of radular structure alone, we have no hesitation in placing *Ariophantopsis* in the Helicarionidae, tentatively

in the subfamily Dyakiinae, and consider that it is totally unrelated to *Amphidromus*.

Ecology

Information concerning the habits and mode of life of the species of *Amphidromus* is almost non-existent. They have generally been collected crawling on trees or shrubs, but no life history studies have been published and only a few random observations are scattered through the literature. The most important is that of Paravicini (1921) on egg-laying.

His observations were made on *Amphidromus palaceus* var. *pura* at Palimanan, Java, in October, 1920. Natives brought in two nests with the snails depositing eggs. One snail had folded the exterior leaves of a young bamboo shoot and gummed them together into a pointed cornet. The shoot hung vertically with the narrow end pointed upward and the wide opening below. The upper part of the sack was filled with eggs when collected. The snail descended slowly, rotating around its longitudinal axis, and deposited eggs until the entire cavity was filled. If a crack in the basket exposed eggs to the air, they quickly dried up. Two days after capture, egg-laying was finished and the snail closed the opening by folding over more leaves. Probably four days were spent in egg-laying, since the cavity was half filled at the start of observations. A second nest of similarly folded *mangga* leaves contained 234 eggs.

The volume of eggs in each case greatly exceeded the size of the snail, indicating that the eggs must be encapsulated just before deposition. The capsules were very thin and dried quickly upon any exposure to the air. October marked the start of the rainy season and probably this is the normal breeding period. Eggs of *A. porcellanus* were reported by van Benthem Jutting (1950, p. 493) to have started hatching only ten days after being laid. Similar nest-building habits have been reported for other species, but no complete study of a life cycle has been published.

No information is available on the feeding habits, cycle of activity, longevity, rate of growth, etc.

Fossil Record

No pre-human fossil occurrences have been recorded. Van Benthem Jutting (1932) reported several specimens of *A. filozonatus* that had been eaten by natives from Sampoeng Cave, central Java,

and later (van Benthem Jutting, 1937, pp. 92-94) a single specimen of *A. palaceus* from the Trinil Beds of Java. Neither record antedates human occupancy, and thus yields no record on the early history of *Amphidromus*.

Supraspecific Classification

The following nomenclatural units are available for use as sections or subgenera of *Amphidromus*:

Amphidromus Albers, 1850, Die Heliceen, 1st ed., p. 138 (part).

Type species.—*Helix perversus* Linné, 1758, by the subsequent designation of von Martens (1860, Die Heliceen, 2nd ed., p. 184).

Syndromus Pilsbry, 1900, Man. Conch., (2), 13: 184.

Type species.—*Helix contraria* Müller, 1774, by the subsequent designation of Zilch (1960, p. 623).

Goniodromus Bülow, 1905, Nachr. d. Malak. Gesell., 37: 83.

Type species.—*Amphidromus (Goniodromus) bülowi* Fruhstorfer, 1905 (mono-type).

It is very difficult to decide how to use these names. Specimens of *Goniodromus* typically have an eroded surface and a characteristic basal angulation to the aperture that is closely approximated by *A. ingens* and *A. placostylus*, although these two species have the smooth surface of a typical *Amphidromus*. It is possible that the specimens placed in *Goniodromus* represent diseased individuals or populations.

Similarly, on Java, Borneo and the Philippine Islands it is easy to separate *Syndromus* from *Amphidromus* types, but there are many species on the mainland of southeast Asia that cannot be readily assigned to either, and different authors have placed them in both "subgenera." The little anatomical evidence suggests that species of *Syndromus* have a much shorter epiphalllic flagellum than species of *Amphidromus*, but only a handful of species have been dissected.

We have chosen to group the species into a series of possibly related complexes, based partly on morphological similarity and partly on geographic distribution. These groups, twenty in number, will primarily aid in identifications and are as near as we can come to indicating relationships. Groups VII through XIII are what is normally called *Amphidromus*, sens. str.; Groups XIV through XIX are *Syndromus*; and Group XX is *Goniodromus*. Groups I through VI contain species that do not fit comfortably into any of the

named divisions. Groups I through III are perhaps most similar to *Syndromus*, Groups IV and V to *Amphidromus*, sens. str. Group VI is intermediate between *Amphidromus* and *Goniodromus*. Groups XIV through XIX are arranged geographically, and comments are restricted to differential features within groups. We have attempted to provide brief diagnoses for the remaining groupings.

We consider that *Goniodromus*, *Syndromus* and *Amphidromus*, sens. str., represent directions of differentiation within one basic phyletic unit, and that this differentiation has proceeded furthest on the Indonesian Islands. Available evidence is insufficient to divide *Amphidromus* into smaller units with any degree of assurance, yet the names do delineate directions of phylogeny within the genus and thus have some utility. For nomenclatural purposes, we are referring to Groups I through VI as "Amphidromus, base stock"; Groups VII through XIII as "Amphidromus, sens. str.>"; Groups XIV through XIX as "Syndromus"; and Group XX as "Goniodromus." No formal descriptions of these terms are given.

ACCOUNT OF THE SPECIES OF AMPHIDROMUS

In the following list 75 species of *Amphidromus* are recognized and another seven names placed under *incertae sedis*. The latter include unrecognizable names, one species (*A. costifer*) based on teratological individuals, and species whose true locality is still unknown. Adequate collections will undoubtedly result in reducing some of the species listed below to subspecific and varietal status. Particularly in regard to the forms described from southeast Asia, we feel little confidence that many of the following named species are not just color forms. Unfortunately, almost all of the available material was collected before 1900 and was accompanied by totally inadequate locality data. Siamese collections in the U. S. National Museum did suggest the following revision of the *A. atricallosus* complex and a few notes on the *A. xiengensis* series. No similar collections from Burma, Malaya, Pakistan, India, Laos, Cambodia and the Viet Nams were seen, and discussion of forms from these areas is based on a re-evaluation of material examined by Fulton and Pilsbry.

Material from Indonesia and the Philippines was much more plentiful and our treatment of taxa from these areas seems to be on a much firmer basis. We have benefited considerably from the earlier studies of van Benthem Jutting, Haniel and Rensch on the

Indonesian species. Bartsch's studies on the Philippine forms provided an analysis of variability from which a systematic treatment could be derived.

Under each species, we have attempted to outline its known range, provide a set of diagnostic characters by which it can be separated from its near relatives, and give a discussion of the validity and identifying features of all named variations. These notes are based primarily upon material examined in American museums by the junior author, supplemented by data abstracted from the literature. Nomenclatural details and citations of literature are omitted from the species accounts but may be found in the alphabetical list of names (see pp. 596-673).

The comprehensiveness of the notes on each species is directly correlated with the amount of new information that could be added. For many of the southeast Asian forms we could only summarize previously recorded data. The treatment given *A. adamsii* and *A. quadrasi* illustrates the two extremes. For *A. adamsii* we had available only material that had been studied by Pilsbry and Fulton. As a result we could add very little new information. For *A. quadrasi* we had a number of good sets with adequate locality data. Thus we could present a new interpretation of the observed variability of this species.

It is hoped that new collections from all parts of the range of *Amphidromus* will enable clarification of many points below that are now uncertain. We shall be quite willing to identify material that is accompanied by accurate locality data, and we hope that this synthesis of data will encourage new investigations of the genus.

AMPHIDROMUS, base stock (Groups I through VI)

I. GROUP OF *Amphidromus sylheticus* (Reeve, 1849)

Relatively small (21-35 mm. high), slender to globose, thin-shelled, sinistral species with 5 to 6 whorls and a very thin parietal callus. Umbilicus widely open, spire whitish with yellow lower whorls. Banding absent, narrow zones of intense yellow, or two or three reddish-brown spiral bands on basal portion of body whorl.

Amphidromus sylheticus (Reeve, 1849)

Range.—Khasi and Garo Hills, Assam, with a possible subspecies (*lepidus* Gould, 1856) on the Mergui Islands.

Remarks.—The absence of reddish-brown spiral bands is the only character separating *sylheticus* from *sinensis*. Both species have a

squat globose form and a more slender variety, which are equivalent to the variation illustrated for *Amphidromus martensi* (fig. 20). All examined specimens were from the Khasi Hills (CNHM 41468, CNHM 72386, AMNH 53074, AMNH 53923). Height ranged from 21.6 to 26.0 mm., h/d ratio 1.55-1.68. No material of *lepidus* was seen, but variation in the examined material from Assam suggested that *lepidus* is probably no more than subspecifically distinct.

Amphidromus sinensis (Benson, 1851)

Range.—Khasi Hills, Assam; Chittagong, Pakistan; Pegu and Shwedgee, Burma; and variety *indistinctus* Pilsbry, 1900, from Laos.

Remarks.—The two or three reddish-brown spiral bands on the basal portion of the body whorl are diagnostic. Lip and aperture are white, lower whorls yellow. Without new field studies the relationship of *sylheticus* and *sinensis* cannot be determined. Possibly they are only color forms of one species.

Size and shape of the banded forms vary considerably; the largest shell seen (CNHM 97310, from Pegu, Burma) was 33.8 mm. high, h/d ratio 1.87 with $6\frac{1}{4}$ whorls, the smallest example (AMNH 53904 from Chittagong, Pakistan) 21.2 mm. high, h/d ratio 1.51 with $4\frac{7}{8}$ whorls. Several variations have been named. Typical *sinensis* from the Khasi Hills is slightly stouter than most *sylheticus*. Variety *vicaria* Fulton, 1896, is a more slender shell, occasionally with the brown bands extending above the periphery and onto the spire. Variety *gracilis* Fulton, 1896, has the brown basal bands and a few indistinct brown dots on the upper spire. Variety *indistinctus* Pilsbry, 1900, known only from the type, may prove to be a pale variant of *Amphidromus xiengensis* (Morlet), but without new material it should be left as questionably a form of *sinensis*. *Bulimus roemerii* Pfeiffer, 1862, from "Laos" is a very squat globose shell known only from the type collection. At first glance it is quite distinct from *sinensis*, but specimens from Chittagong (AMNH 53904) and Pegu (MCZ uncatalogued) show variation ranging from the globose *roemerii* to the elongate *vicaria*. These names have little utility other than to describe individual variations.

No material of this complex collected after 1900 was seen and the above notes are based solely on pre-1900 museum specimens.

II. GROUP OF *Amphidromus mouhoti* (Pfeiffer, 1861)

Somewhat larger (35 mm. high), rather acutely conical, amphidromine shells with the peristome and callus pink, purple, or brown in color.

Amphidromus mouhoti (Pfeiffer, 1861)

Range.—Described from "Siam" and subsequently collected at Brelum, Stieng Area, Cochinchina.

Remarks.—The lilac-rose aperture, buff with green-lined spire, and brown-spotted upper whorls are diagnostic.

Amphidromus cruentatus (Morlet, 1875)

Range.—Thailand, Cambodia and Upper Perak.

Remarks.—The purple peristome, roseate apical whorls, sub-sutural color bands and straw-colored shell distinguish this species. The Kenering, Upper Perak, record is based on material collected by C. Wray (Raffles Museum, CNHM 72359). Both dextral and sinistral shells were represented.

Amphidromus glaucolarynx (Dohrn, 1861)

Range.—Thailand and Cambodia.



FIG. 17. *Amphidromus glaucolarynx fasciatus* (von Martens); holotype of *A. perrieri* Rochebrune. Forest of Prek-Scholl, Cambodia. Photographs by courtesy of Musée National d'Histoire Naturelle, Paris.

Remarks.—The violet-purple aperture, slender shape, and broad vertical purple-brown streaks separate *A. glaucolarynx* from previously mentioned species. The variety *fasciatus* von Martens, 1867,

from Petschaburi, Thailand, has a squatter shape and broader and less distinct color streaks than the nominate form. *Amphidromus perrieri* Rochebrune, 1882 (fig. 17) is a synonym of variety *fasciatus*, known only from the forest of Prek-Scholl, Cambodia. Originally described from "Siam," specimens were seen from Muang Lampan (CNHM 72397) and a farm on the Klang Klung River, Kam Peng Pet Province, Thailand (CNHM 33043). The exact locality of *albicans* von Moellendorff, 1902, is unknown and it is uncertain whether to consider it a variety or a subspecies.

Amphidromus pattinsonae Iredale, 1943

Range.—The only known specimen came from the Maymyo Road, 40 miles northeast of Mandalay, Burma.

Remarks.—The purple apex, crimson-lake aperture, slender shape, umbilical banding, and two mid-whorl interrupted color bands present a combination of characters not duplicated by any other mainland species. The 28 mm. high holotype is immature, and thus the adult size is unknown.

Amphidromus rhodostylus von Moellendorff, 1901

Range.—Pha Rang (=Phan Ran?), Annam and Kampot, Cambodia.

Remarks.—Characterized by its red columellar area and white peristome. The varietal names *bipartita*, *ignea*, *nigrolineata*, *rhabdota*, *roseolineata*, *simplex* and *subconfluens* von Moellendorff, 1901, refer to color variations within the type population. For nomenclatural purposes, variety *simplex* may be taken to represent the nominate form. Apparently only sinistral shells are known.

Amphidromus smithii Fulton, 1896

Range.—The two known specimens were collected in Annam by Eudel.

Remarks.—The brown aperture and more elongate shell separate *A. smithii* from *A. mouhoti*. Possibly they are color forms of one species.

Amphidromus begini (Morlet, 1886)

Range.—Known from the type collection on the Stang Trang plateau of Cambodia.

Remarks.—No material of this form was seen. The brown aperture, small size (25 mm.), and brown apex suggest affinities to this

complex. It differs strikingly in the heavy longitudinal ribs, some of which are forked, and the brownish streaks between the ribs. The type figures show a marked similarity to the Central American *Drymaeus jonasi* (Pfeiffer) in color and sculpture, but differ, of course, in direction of coiling and aperture.

III. GROUP OF *Amphidromus schomburgki* (Pfeiffer, 1860)

Relatively larger (40–50 mm. high), amphidromine shells with a generally green deciduous periderm. Peristome and callus pink, red or brownish.

Amphidromus schomburgki (Pfeiffer, 1860)

Range.—Thailand.

Remarks.—A solid, heavy shell with purplish lip and callus and oblique greenish streaks on a deciduous periderm. The nominate variety has spiral purple bands on the entire spire. Variety *moellendorffi* Haas, 1934 (= *kobelti* von Moellendorff, 1902, not Rolle, 1893), has the purple bands confined to the upper spire and the green stripes distinctly outlined and separated. Variety *crossei* Pfeiffer, 1862, has the greenish streaks greatly reduced and the purplish color on the spire reduced to a light pinkish purple and the columellar region brownish. *Amphidromus givenchyi* Geret, 1912, was described from a single shell without locality data. It differs from the other varieties in only minor characters and probably is a synonym. Apparently *A. schomburgki* is a moderately common shell in Thailand. Early localities are Srakao and Hinlap, and subsequent collections have added much additional data.

Amphidromus laosianus Bavay, 1898

Range.—Khone, upper Mekong River, Laos.

Remarks.—The more rounded form, pink aperture, and brownish flammulations easily separate this species. Variety *albocaerulescens* Bavay, 1898, was based on individuals from the type population that lacked the strong flammulations. The pink aperture and flammulations suggest a possible relationship to *schomburgki*, although the shape and varix may indicate that *laosianus* is another variant of the *atricallosus* complex.

Amphidromus ventrosulus von Moellendorff, 1900

Range.—Phuc-son, Annam.

Remarks.—The stouter form, yellowish color, subsutural line, and purple peristome suggest that this is a distinct species more closely

related to *schomburgki* than to *smithii* of the *mouhoti* complex. A type lot specimen (CNHM 72383) is much stouter than the lectotype figured by Zilch (1953, pl. 23, fig. 19).

Amphidromus roseolabiatus Fulton, 1896

Range.—The two known specimens were labeled "Siam."

Remarks.—The size (36 mm. high) and coloration are such that this may well be based on faded examples of *A. haematostomus*.

Amphidromus haematostomus von Moellendorff, 1898

Range.—Beloven Plateau, east bank of Mekong River, Annam.

Remarks.—Two color phases were represented in the type set, a bright yellow shell named variety *varians* von Moellendorff, 1898, and a greenish form, variety *viridis* von Moellendorff, 1898, which is here taken to represent the typical pattern. Four of the five known shells are in the Senckenberg Museum, Frankfurt. The illustrations in Zilch (1953, pl. 22, figs. 4-5) strongly suggest that *haematostomus* is a synonym of *roseolabiatus*.

Amphidromus masoni (Godwin-Austen, 1876)

Range.—Dihiri Parbat, Dafla Hills, Assam, at 2,000 feet elevation.

Remarks.—The purplish columella and conical shape suggest that this is a dwarf member of the *schomburgki* complex, rather than one of the *sylheticus* or *mouhoti* groupings. The manuscript name *daflensis* Godwin-Austen, 1878, may be on some museum specimens. The only example at hand (AMNH 52954 from "Naga Hills") is quite worn, with only a faint trace of coloration. The shell is 36.9 mm. high and 20.2 mm. in diameter, with 6 $\frac{7}{8}$ whorls.

IV. GROUP OF **Amphidromus dautzenbergi** Fulton, 1899

Rather thin, medium-sized (40-45 mm. high), amphidromine shells, variously colored, with a thin peristome and the body whorl shouldered at the periphery.

Amphidromus dautzenbergi Fulton, 1899

Range.—Reported from many localities in Tonkin.

Remarks.—The shouldered body whorl, imperforate umbilicus, and very thin, fragile shell effectively separate this from all other mainland *Amphidromus*. *Amphidromus pvariabilis* Bavay and Dautzenberg, 1908, is a synonym of *A. dautzenbergi*. Variations in

shape and color have been recognized by the following names: *bifasciata* Bavay and Dautzenberg, 1909; *goniostoma* Bavay and Dautzenberg, 1908; *liliacina* Bavay and Dautzenberg, 1909; *monozonalis* Bavay and Dautzenberg, 1909; *obesa* Bavay and Dautzenberg, 1909 (not von Martens, 1867); *protracta* Bavay and Dautzenberg, 1908; and *tricolor* Bavay and Dautzenberg, 1909. These are illustrated by Bavay and Dautzenberg (1909, pls. 9-10) under the name *Amphidromus perversibilis*. A dwarf shell was named variety *minor* Bavay and Dautzenberg, 1908. Possibly *A. dautzenbergi* is only an extreme variant of the *schomburgki* series.

V. GROUP OF *Amphidromus metabletus* von Moellendorff, 1900

The solid, white, elongated shell with closed umbilicus and a microsculpture of very fine spiral lines is quite distinctive. The aperture is short when compared with other groups, and the lip is thickened and recurved.

Remarks.—*Bulimus cochinchinensis* Pfeiffer, 1857, may prove to be either an elongated variant or a species closely related to *Amphidromus metabletus*. Since the only known material of *cochinchinensis* has only the locality "Cochin China" and was collected over 100 years ago, we prefer to leave that name among *incertae sedis*.

Amphidromus metabletus von Moellendorff, 1900

Range.—Mother and Child Mountain, Bai-Min Island, and Nha-Trang, Annam.

Remarks.—The nominate form from Mother and Child Mountain, Annam (CNHM 41490), is more elongate, less solid and with a less swollen apex than the subspecies *pachycheilus* von Moellendorff, 1901, from Nha-Trang, South Annam. The form called *insularis* von Moellendorff, 1901, from Bai-Min Island is a dwarf island race of *A. metabletus pachycheilus*. Color variations of *pachycheilus* were called *alba*, *confuens* (CNHM 62789), *flava* (for nomenclatural purposes equivalent to *pachycheilus*), *fusca*, *interrupta* (CNHM 97321), *tritaeniata* and *trizona* (CNHM 72434) by von Moellendorff, 1901. Color variations of other subspecies were not given nomenclatural recognition. All named forms are figured by Zilch (1953).

VI. GROUP OF *Amphidromus cambojiensis* (Reeve, 1860)

Shell quite large (60-75 mm. high), solid, amphidromine, brownish white, sometimes with irregular flame-like bars of darker brown, aperture white or purplish, whorls with a distinct subsutural indentation.

Amphidromus cambojiensis (Reeve, 1860)

Range.—Described from "60 leagues north of Saigon, in the Stiengs country or Moi" of Cochinchina, with subsequent records of "Cambodia." No precisely localized material was seen.

Remarks.—Material labeled "Cambodia" or occasionally "Siam" is not uncommon in museum collections. The smallest shell (CNHM 72419) was 61.5 mm. high and 31.7 mm. wide, with $7\frac{1}{4}$ whorls; the largest (USNM 317831) was 70.3 mm. high and 35.3 wide, with $8\frac{1}{8}$ whorls. Most shells had the aperture purplish and the peristome and callus white. The shell surface is relatively smooth, with a heavy brown varix and irregular brownish flammulations. The spire is moderately swollen and the whorls exhibit a distinct subsutural concavity that is not found in other groups of *Amphidromus*.

Amphidromus placostylus von Moellendorff, 1900

Range.—Phuc-Son, Annam.

Remarks.—The shape, coloration and sutural indentation are much as in *A. cambojiensis*, but *A. placostylus* differs in having a proportionately larger aperture, a thinner callus, and distinct angulation at the juncture of columellar and basal lips (Zilch, 1953, pl. 25, fig. 41).

Amphidromus ingens von Moellendorff, 1900

Range.—Mother and Child Mountain, Annam.

Remarks.—*Amphidromus ingens* differs from *A. placostylus* in being slightly more acutely conical with a sharper apertural angle and more prominent subsutural indentation (see Zilch, 1953, pl. 23, fig. 25). These are relatively minor and further collections may result in combining the two. In general appearance, *A. ingens* comes closest to being a transition from *Amphidromus* to *Goniodromus*, the apertural characters closely resembling those of *A. asper*. The single specimen of *A. ingens* examined (USNM 184563) was 60.5 mm. high and 35.4 mm. wide, with $6\frac{1}{4}$ whorls. The only locality was "Annam," but the shell was received from von Moellendorff and might be a paratype.

AMPHIDROMUS, sens. str. (Groups VII through XIII)**VII. GROUP OF *Amphidromus atricallosus* (Gould, 1843)**

Shell moderately large (40–55 mm. high), solid, highly polished, with yellow ground color, usually amphidromine, with or without varices, color blotches, spiral bands, or shaded zones.

Remarks.—The following species are the mainland representatives of the *perversus* complex. They appear to be specifically distinct from *A. perversus*, but it would not be surprising if forms such as *A. dohrni* were eventually treated as subspecies of *perversus*. The arrangement of these species is only tentative. Collections from Thailand (USNM and ANSP) did suggest the union of *atricallosus*, *leucoxanthus* and *perakensis* and also provided intriguing suggestions of intergradation between *comes* and the above. Insufficient localized material of *janus* and *dohrni* was seen to allow adequate interpretation of their status.

Amphidromus (Amphidromus) atricallosus (Gould, 1843)

Range.—Malaya, Lower Burma and southern Thailand.

Remarks.—The three “species” united here were formerly separated as follows:

A. atricallosus (Gould, 1843) has a dark-brown or black callus and varix and a relatively broad white subsutural zone. The shells are generally rather large (50–55 mm. high). *Bulimus eques* Pfeiffer, 1857, has long been recognized as a synonym. Described from coastal Burma.

A. leucoxanthus (von Martens, 1864) has the white subsutural zone and dark varix of *atricallosus* but lacks the darkened parietal callus. Some examples have a dark apex and various dark markings on the upper whorls. Described from Thailand.

A. perakensis Fulton, 1901, has the white subsutural zone but lacks the varix and darkened callus. It differs from *leucoxanthus* in having the columella with a distinct twisted plait. Described from Perak.

Material collected in recent years shows that these variations occur in different combinations in all parts of the range and are not indicative of speciation. Thus, the columellar plait of *perakensis* is prominent in type lot shells from Perak (CNHM 72416), Bukit Serampang, Johore (CNHM 73458), and Kuala Trenggan, Pahang (CNHM 73456), but it is almost completely lacking in material from Sungai Ujong, Perak (CNHM 72421). Other Malayan records (Gapis, Perak, and Kuala Terla, Telom Valley, Pahang) are of an elongate shell, while specimens from Pulau Pemangil, an island slightly northeast of Mersing, Johore (USNM 522360), are a dwarf (41.0–42.1 mm. high), very obese (h/d ratio 1.60–1.71) form with *perakensis* coloration and columella. Most Malayan shells are 50–55 mm. high with h/d ratio 1.75–1.87.

Another dwarf (37.2-45.2 mm. high) lot from Nong Khor, south-east Thailand (USNM, MCZ 184037), has the *leucoxanthus* color pattern, but the columellar plait of *perakensis*. Some lots from Thailand, for example CNHM 72420 from Khao Sabop, are typical *leucoxanthus*, while others, for example MCZ 75611 from (?) Huey Yong, are typical *atricallosus*, which is otherwise recorded from coastal Burma and Penang (MCZ 47426). Most shells with *atricallosus* pattern have a simple columella, for example a topotype from Tavoy, Burma (CNHM 72403), but some individuals (USNM) had a partially developed columellar plait. An exceedingly interesting variant was collected at Khao Luang, a mountain in the chain between Thailand and Tenasserim at 11° 40' N. (ANSP, CNHM). The two dextral and two sinistral shells have the purplish black callus and varix of *atricallosus* and the white subsutural zone, but they differ in having a distinct brownish color suffusion on the body whorl that is intensified into vague radial streaks and partially interrupted by a submedian spiral yellow band as in some of the *perversus* color forms (*sultanus*, *interruptus*). This type of coloration on the body whorl is also characteristic of *A. comes* and suggests that possibly that species is also closely related to *atricallosus*.

Available localized specimens are too few in number to decide whether subspecies can be recognized. Possibly the Malayan populations can be recognized as *A. atricallosus perakensis*, but the Thailand shells examined strongly suggest that no line can be drawn between *atricallosus* and *leucoxanthus*.

Amphidromus atricallosus, as delineated here, differs from *A. perversus* in the form of the lip. In the latter the lip is rolled back and adnate, while in *atricallosus* it is broadly expanded and reflexed without being adnate. Besides the difference in lip structure, the columellar plait and darkened callus, when present, are diagnostic.

Amphidromus (Amphidromus) comes (Pfeiffer, 1861)

Range.—Annam, Cochinchina, Cambodia and Thailand.

Remarks.—The apex may be dark or white and light purplish brown spiral color bands may be present or absent on the spire. Generally the lower whorls have a greenish-yellow tone, sometimes interrupted by a submedian spiral yellow line, and often more or less distinctly organized into radial flammulations. The form *polymorphus* Tapparone-Canefri, 1874, has the radial flames reddish-brown and not reaching to the periphery, with the greenish coloration reduced. Lip and peristome are white, with the lip structure as in

atricallosus. *A. comes* is common in old collections, but no material with exact locality data was seen by us in American museums. Known locality records are listed by Pilsbry (1900, pp. 170-172).

Amphidromus (Amphidromus) janus (Pfeiffer, 1854)

Range.—Definitely known only from the Mergui Islands.

Remarks.—To a certain extent, *A. janus* combines the characters of *A. atricallosus* and *A. comes*. It has the darkened callus and the whitish subsutural zone of the former combined with greenish or reddish brown spiral bands or zones not unlike those of the latter. In *A. janus* the color pattern is almost entirely spirally oriented, although often interrupted and spotted. The lip has the same structure as in *A. atricallosus*. The only available specimens (AMNH 40856 and 52950) had the clearly erroneous locality "New Hebrides." They ranged in size from 39.5 to 46.9 mm. New field collections are needed to determine the relationship of *janus* and *atricallosus* on the Mergui Islands.

Amphidromus (Amphidromus) dohrni (Pfeiffer, 1863)

Range.—Reported from Poulo-Condor, Cochinchina, and Thailand, without any more precise data.

Remarks.—*A. dohrni* differs from the other members of this complex in aperture size, lip structure, and coloration. It is a more slender, less swollen shell with proportionately smaller aperture, and the lip is only narrowly expanded with the rolled edge adnate to the body whorl as in *A. perversus* rather than as in *A. atricallosus*. *A. dohrni* has a rather intense yellow base color, a brown or black line behind the lip that sometimes ascends partly up the parietal callus with the base of the shell green. In some examples the greenish zone of the basal body whorl extends partially up onto the spire. No specimens with exact locality were seen, although, like *A. comes*, this species is common in old collections. The exact relationship of *A. dohrni* and *A. perversus* cannot be determined from presently available material.

VIII. GROUP OF *Amphidromus perversus* (Linné, 1758)

Shell solid, polished, amphidromine, moderately large (45-55 mm.) high, usually with a dark varix. Lip and callus white; ground color white, orange, yellow, or yellowish-green. Many specimens with interrupted or continuous radial brownish streaks covering part or all of the whorls on the lower spire and body whorl.

Amphidromus (Amphidromus) perversus (Linné, 1758)

Range.—Sumatra and Java to Borneo, Celebes and Bali. Absent from the Mentawi Chain and Panaitan Island. Its occurrence on Sumbawa needs confirmation. Probably it has been introduced into Singapore. Subspecies recognized here are from Great Natuna, Bawean, Kangean and Riouw Islands.

Remarks.—*A. perversus* undoubtedly offers the greatest array of discretely variable color combinations of any species of *Amphidromus*. Our concept of *A. perversus* includes both *A. perversus* and *A. interruptus* of Pilsbry (1900)—excluding the mainland and Philippine Island forms—with certain forms of Pilsbry's *A. aureus* "Martyn" included as subspecies. These changes result from the invaluable studies of van Benthem Jutting and Bartsch and our own evaluation of variation found in populations sampled during the past few decades. Names formerly used as varieties are here considered to apply to species, and several morphs formerly ranked as species are here reduced to varietal status. Much more material must be reviewed, however, before any classification of this complex can be called more than provisional.

Even with the elimination of the Philippine and mainland names, there are twenty nomenclatural units available for use. We consider that *Bulimus citrinus* Bruguière, 1792 (= *versus* Linné, 1758), and *Bulimus makassariensis* Hombron and Jacquinot, 1852 (= *sultanus* Lamarck, 1822), are synonyms without any differences from earlier names. The remaining varietal names are listed in alphabetical order, with consideration of the subspecies concluding the discussion of *A. perversus*.

The following names refer to color variations of the nominate subspecies, *Amphidromus perversus perversus*:

1. *aurea* Dillwyn, 1817 (not Martyn, 1784), is usable for the orange-colored (instead of yellow) monochrome shells found on Java and Celebes. Apparently an individual variation.

2. *aureus* Martyn, 1784,¹ was based on three shells collected by Sir Joseph Banks, supposedly on Pulau Panaitan. The only *Amphidromus* found there, *A. banksi* Butot, is quite different and the actual locality of *aureus* is still unknown. The shells have a wide, white zone below the suture as in the *A. atricallous* complex and the lower parts of the whorls are yellow, with or without narrow, wavy,

¹ Although Martyn's work was invalidated by action of the International Commission on Zoological Nomenclature, varietal names are not accorded legal status and we continue to use *aureus* as a convenient term of reference.

reddish-brown flammulations. The original specimens in the British Museum (Natural History) appear to be a form of *A. perversus*, but the locality remains a mystery.

3. *borneensis* Pilsbry, 1900, is based on a stout variant of the *interruptus* pattern, whitish in background color, and rather similar to the Javanese subspecies, *emaciatus*. It was described from South Borneo in the Bandjermassin District (CNHM 63377), but there are specimens in the Leiden Museum from East Borneo. The flammulations above the periphery are reduced in number. Possibly this may prove to be a subspecies, but not enough data are available.

4. *infrapictus* von Martens, 1867, was considered by Pilsbry (1900) to be identical with *interruptus* Müller, 1774. At best it might be considered a slightly different stage in an almost continuous series of variations.

5. *infraviridis* von Martens, 1867, probably is a derivative of the Celebesian *infrapictus*. Instead of flammulations and a basal purplish zone it has a pale green or greenish-yellow base which is only slightly darker than the greenish-yellow or citron-colored spire. It is most similar to typical *perversus* but differs in the darker basal portion.

6. *interruptus* Müller, 1774, has a purplish or brownish zone on the base, a yellow or whitish patch near the columella, and brownish flammulations that are somewhat interrupted on the periphery and do not reach the suture above.

7. *mitra* von Martens, 1867, is an unfigured variety from Bali and seems to be intermediate between *interruptus* and *sultanus*.

8. *niveus* P. and F. Sarasin, 1899 (fig. 18) is snow-white with a black varix and black mark behind the peristome. It is an "albino" *perversus* which is common in the Celebes and sporadically seen from Java and Borneo.

9. *obesus* von Martens, 1867, is an unfigured variety which probably can be equated with squat individuals of the typical *perversus* pattern.

10. *perversus* Linné, 1758, is a solid yellow shell with black varix and narrow black band behind the peristome. It is known from the whole range of the species.

11. *strigosus* von Martens, 1867, has continuous, rather narrow, straight brown bands running from the suture to the bottom of the whorl. It is known from Bali, Borneo, and Celebes.

12. *sultanus* Lamarek, 1822, has wavy brown bands running over the entire whorl. The bands are interrupted in the middle of the whorl by a narrow spiral band of the ground color. This variation is found in all parts of the species range.

The above twelve color forms are not of equal value or utility, but the material for a critical revision is simply not available. Many specimens could be referred to either of two forms, and often one locality will yield several variations. The names do provide useful descriptive terms for color variants and are thus included above.

The following isolated populations of *Amphidromus perversus* seem to warrant subspecific status:

Amphidromus perversus butoti, new subspecies. Figures 15, 16.

Holotype.—Zoologisch Museum, Amsterdam.

Type locality.—Bajutan, Kangean Island. Collected by Hoogerwerf on August 20, 1954.

Description.—A brilliantly colored series of populations with highly polished shell surface. The general intensity of the coloration and the strong polish are the only features separating this race from the other subspecies.

Remarks.—The problem of how to treat insular populations which show minor divergence from the main stocks is far from being satisfactorily settled. The intense coloration of the Kangean populations shows a minor difference from the main populations and we have recognized it with a subspecific name. For purposes of future reference, we have selected as holotype a shell with a color pattern quite distinct from any which have been named. Thus, the name *butoti* can at least be used for the color variation if it is decided to include the Kangean populations in the nominate form of *versus*. Besides the nominate color pattern of *butoti*, shells referable to the *infraviridis*, *infrapictus*, *rufocinctus*, *sultanus* and typical *versus* pattern were seen on Kangean Island.

Paratypes.—Specimens were seen from several localities on Kangean Island. The shells from Sepandjang are in Chicago Natural History Museum, no. 97808, in the Zoologisch Museum, Amsterdam, and in Butot; Djukung specimens are in the Zoologisch Museum, Amsterdam; and topotypes from Bajutan are in Chicago Natural History Museum, no. 97806, and in Butot and the Zoologisch Museum, Amsterdam. Some additional material from Kangean Island (USNM 468416, Paravicini!) was seen after the description had been written.

Amphidromus perversus emaciatus (von Martens, 1867)

Range.—Central and East Java, possibly Bali.

Remarks.—The shell is white with rather numerous brown flammulations that become confluent on the base, elongate, and quite slender. Apparently it is a white derivative from the *interruptus* stock, which may have a definite geographic separation in Bali and Java. Material from Kedewan, East Java (Butot, CNHM 72404) ranged from 43.5 to 48 mm. in height.

Amphidromus perversus melanomma (Pfeiffer, 1852)

Range.—Riow Archipelago near Singapore and possibly Perak and Biliton Island off Borneo.

Remarks.—The purple apex, the numerous wavy brown flamulations that are partially interrupted by a yellow peripheral color band, and the solid shell are characteristic. This variety is similar to *sultanus*, but has only partial interruption of the stripes by the color band and has the purple apex. The Biliton record from the early *Samarang* voyage is questionable, and it is quite possible that the Perak records of De Morgan are in error. The only certain localities are the Singapore area and Riouw Archipelago.

Amphidromus perversus natunensis Fulton, 1896. Figure 19.

Range.—Great Natuna Islands; possibly the South Natuna and Anamba Islands also.



FIG. 18. *Amphidromus perversus perversus* var. *niveus* P. and F. Sarasin; lectotype of *A. perversus niveus*. Pare-Pare, Celebes. Photograph by courtesy of Naturhistorisches Museum, Basel.



FIG. 19. *Amphidromus perversus natunensis* Fulton. Anamba Islands. CNHM 72427.

Remarks.—The yellow peripheral band of *melanomma* is absent; otherwise this is close to the Riouw population. *A. p. natunensis* is quite variable in color, ranging from white to dark (see Pilsbry,

1900, pp. 162–163). Possibly some of the material that Jacobi (1895) dissected under the names *A. interruptus* and *A. chloris* belongs here, but the shells were not figured and their location is unknown. The South Natuna Island record needs confirmation, while specimens from Siantan, Anamba Islands (CNHM 72427; fig. 19), are referred here with some hesitation.

Amphidromus perversus rufocinctus Fruhstorfer, 1905

Range.—Bawean Island, Java.

Remarks.—This weakly characterized race differs primarily by its intense color, strong color zone, and slight white margin at the suture. Of seventeen shells collected in May, 1954, by Hoogerwerf at Telaga Kastoba, Bawean Island, ten were dextral and seven sinistral. Three lacked a varix, one was grass green in color, three were whitish, and thirteen had yellow ground color. The name *sankapurus* Fruhstorfer, 1905, refers to white shells with a very dark color band. This variation is similar to *A. perversus butoti*.

IX. GROUP OF *Amphidromus maculiferus* (Sowerby, 1838)¹

Shell moderately solid, medium to large in size (35–72 mm. high), usually sinistral, varix present in some forms. Ground color white, yellow, brown or pink (rarely), plain or variously patterned with brown or hydrophanous markings. Umbilicus open or closed, lip not adnate in its reflexion.

Remarks.—Available material lacks the necessary data to enable correlation of variation in size with local environments and it is thus very difficult to determine the proper rank of the numerous described variations. With some hesitation we have reduced the multitude of names to two species: *Amphidromus chloris* (Reeve) and *A. maculiferus* (Sowerby). Typical specimens are quite different, but the islands of the Sulu Archipelago have yielded a number of poorly localized ("Sulu Archipelago") shells that show insensible gradations between typical *chloris* and forms previously associated with *maculiferus* and *inflatus*. Size, shape, and umbilical opening cannot be used in separation, nor can the presence or absence of apical purplish markings. No localized set from the Sulu area contained more than three shells, so that we have no knowledge of the range of variation. In order to achieve even a provisional classification, we

¹ [Credit for the considerable amount of work needed for this re-study of Bartsch's series and of other material from the Philippine Islands is entirely due to Dr. Solem, but I can add that I am in full agreement with his findings, which clarify, in what I believe to be a very satisfactory way, ideas held more vaguely by myself.—F. F. LAIDLAW]

have had to use two comparatively minor characters to distinguish doubtful forms. The presence of distinct rust or brown streaks or clear hydrophanous markings is assumed to be a character of *A. maculiferus*—their absence, coupled with some form of subsutural white zone, an indication of *A. chloris*. Pale forms of *maculiferus* such as *inflatus* lack the subsutural white zone as well as the brownish markings, but in size and shape seem clearly referable to the larger species. Forms of *chloris* such as *pallidulus* do not have the subsutural zone (being all white) but in size and shape are near typical *chloris*. Some forms of *chloris* such as *calista* have a general brownish color infusion but no distinct marks.

Adequate materials may well result in division of this complex into several species. Available materials counsel the very conservative treatment presented below.

Since Bartsch (1917) recognized fourteen species where we propose to allow two, a word of explanation is necessary. The difference lies in a completely different approach. Bartsch classified organisms through the rigid application of single alternative characters. Thus, all yellow shells were "Group of *Amphidromus chloris*," yellow shells with dark apical markings were "Group of *Amphidromus inflatus*," and yellow shells with dark apical markings and brownish markings on the lower whorls were "Group of *Amphidromus maculiferus*." Although large sets seen by him showed a great range in variation, he would name single shells from different localities as full species on the basis of size and shape differences well within the range of variation shown by single sets (*cosmius*, *basilanensis*, and *apoensis*, for example). Subspecies were established wherever any slight difference could be detected. At times the extreme variant in a set would be designated as a holotype while paratypes would insensibly grade into another subspecies (*malindangensis* and *cataganensis*, see below). His concept of systematics on the specific level greatly over-emphasized the importance of variations in one character; on the subspecific level geography rather than statistically significant differences was the decisive factor.

We reject both of his criteria, since species are best defined by a complex of characters and are composed of numerous populations, among which minor variations are the expected norm and not the signal for creation of subspecific names. In particular, we deplore his tendency to erect species based on one shell of dubious locality or upon figures of specimens in the earlier literature. Our revision of

A. entobaptus and *A. quadrasi* (see below) is based on a similar rejection of Bartsch's standards.

An example of the difficulties in working with the *maculiferus* complex concerns the forms from Basilan Island; six have been described, only one from an exact locality. Four of the six are known from a total of seven specimens. We thus make no apology for the tentative nature of our conclusions.

Amphidromus (Amphidromus) chloris (Reeve, 1848)

Range.—Sulu Archipelago from Bilitan to Basilan and on the peninsular portion of Zamboanga Province, Mindanao, Philippines.

Remarks.—Typical *chloris* (and its synonym *Bulimus sulphuratus* Hombron and Jacquinot, 1852) from Zamboanga is a slender yellow shell with a white subsutural band, a moderately open umbilicus and a relatively small aperture. It lacks varices or brown markings and the reflected lip is less adnate than in *A. perversus*. Bartsch (1917, p. 25) reported that 393 shells from Talantalan ranged from 34–48.2 mm. in height (mean 39.85), with 5½ to 7 whorls. Figured examples of this set (Bartsch, 1917, pl. 12, figs. 1–6, 8) encompassed the entire range of shape variation shown by the other named varieties. Some shells (figs. 4–6) show traces of brown coloring, thus linking typical *chloris* to form *calista* Pilsbry, 1900, from Basilan. Variety *pallidulus* Pilsbry, 1900, is a pure white (CNHM 97337) or yellowish white form from Zamboanga and var. *purissimus* Pilsbry, 1900 (CNHM 97344), is its Basilan equivalent. Variety *rosa* Pilsbry, 1900, is a pink-tinged shell from Basilan, known only from the holotype. A specimen from Loran Island (USNM 215638) mentioned by Bartsch (1917, p. 27) is typical *chloris*.

The aperture of most of the above forms is proportionately small, although some individuals of *calista* have apertures intermediate in size between those of typical *chloris* and the *bilatanensis-roeseleri* variations mentioned below. *Amphidromus suluensis* Bartsch, 1917, is known from "Islands of the Sulu Sea" and has a closed umbilicus and a slightly narrower subsutural white zone. Specimens from Zamboanga identical in respect to umbilicus and color were seen (CNHM 75801), and *suluensis* must be considered a synonym of *chloris*. What Bartsch perhaps optimistically referred to as "varices" on the types of *suluensis* are vague lighter streaks similar to those found on almost any Zamboanga shell.

The status of *bilatanensis* Bartsch, 1917, and *roeseleri* von Moellendorff, 1894, is more difficult to determine. *Amphidromus bilatan-*

ensis was described from published figures and Bartsch never saw any specimens. The only Bilatan shell we saw (AMNH 53905) is 49.8 mm. high and 27.6 mm. wide, with 5 $\frac{1}{8}$ whorls. It is a very pale yellowish-white with lighter white streaks, a swollen body whorl, narrowly open umbilicus, and relatively large aperture. This is slightly larger than the Jolo (=Sulu) Island *roeseleri* (USNM 215576), which were 46-48 mm. high, but the difference is not significant. In the original description of *roeseleri*, von Moellendorff referred to the illustrations of the Bilatan shells on which Bartsch based his *bilatanensis* and commented that probably they were the same. We concur that *bilatanensis* and *roeseleri* are not separable.

Their exact relationship to *chloris* is uncertain. We are placing them as a probable subspecies, primarily on the basis of variation found in two sets of shells from the "Sulu Archipelago" collected by the herpetologist, E. H. Taylor (CM, uncatalogued). One set of twelve shells (36.4-42.0 mm. high, mean 38.6 mm.) with 5 $\frac{1}{4}$ to 5 $\frac{7}{8}$ whorls consisted primarily of the squat, rather globose form of *chloris* (Bartsch, 1917, pl. 12, fig. 4) and presented a complete transition between the openly umbilicated *chloris* and the closed umbilicus of *suluensis*. The other set of six shells ranged from 41.7 to 55.2 mm. in height (mean 47.5 mm.), with 5 $\frac{1}{8}$ to 6 $\frac{1}{4}$ whorls. The smaller specimens are typical *chloris* in color and open umbilicus. Two intermediate shells have the *chloris* size and shape but a closed umbilicus and pale coloring, while the largest shells are the size and color of *bilatanensis* but also have a closed umbilicus.

Finally, *Amphidromus mearnsi* Bartsch, 1917, is a composite "species." The holotype from Atingating, northwest Basilan (USNM 245565), is 47 mm. high with 6 whorls. The color is typical *chloris* and the umbilicus is narrowly open. An adult paratype from "Basilan" (USNM 245566) is 55 mm. high with 6 $\frac{1}{2}$ whorls. In shape and sculpture it is identical with the *cosmius* variation of *A. maculiferus*, differing only in being slightly (3 mm.) smaller and lacking the faint hydrophanous bands of *cosmius*. The paratype of *mearnsi* lacks any subsutural white zone, and we suspect that it is a pale form of *A. maculiferus*. *Amphidromus basilanensis* Bartsch, 1917, *A. maculiferus cosmius* Bartsch, 1917, and the paratype of *mearnsi* are known from four adult shells, all labeled "Basilan Island." They represent decreasing prominence in the radial streaks, and we consider them to be variants of *A. maculiferus*.

The taxonomic treatment of the Sulu Island populations cannot be settled until collections from individual islands become available

for study. As a temporary expedient, we propose to recognize two subspecies and group the synonymy of *A. chloris* as follows:

Amphidromus chloris chloris (Reeve, 1848)

Range.—Zamboanga peninsula of Mindanao and Basilan.

Synonyms.—*Bulimus sulphuratus* Hombron and Jacquinot, 1852; *Amphidromus suluensis* Bartsch, 1917; and *Amphidromus mearnsi* Bartsch, 1917.

Color forms.—*calista* Pilsbry, 1900; *pallidulus* Pilsbry, 1900; *purissimus* Pilsbry, 1900; and *rosa* Pilsbry, 1900.

Amphidromus chloris roeseleri von Moellendorff, 1894

Range.—Bilatan, Jolo (=Sulu) and probably other islands of the Sulu Archipelago.

Synonym.—*Amphidromus bilatanensis* Bartsch, 1917.

This arrangement recognizes the larger size and aperture of *roeseleri*, but undoubtedly over-simplifies the existing situation, since the shell from Loran Island in the Tawi Tawi group mentioned above is typical *chloris*. Thus *chloris* and *roeseleri* may have a mosaic distribution pattern. Currently available specimens are too few to clarify the true relationship.

Amphidromus (Amphidromus) maculiferus (Sowerby, 1838)

Range.—Mindanao and its satellite islands Samal, Basilan, and Lampinigan; Bohol; southwest Leyte and the satellite Camotes Islands; and Samar? (questionable record). Specimens were given to Semper while he was on Cebu, but it is very doubtful that they were collected there.

Remarks.—It is exceedingly difficult to know how to cope with the numerous named variations. The 21 available names, with three exceptions, do represent recognizable variations in color, size or shape, some minor in character, others presenting a distinctive appearance.

The name *dextrorsus* Pfeiffer, 1853, was proposed for dextral individuals of a generally sinistral species and has no utility; variety *obscurus* Fulton, 1896, cannot be separated from the nominate form of *maculiferus*; and the unfigured *Amphidromus nigrofilosus* Rochebrune, 1882, probably is a mislabeled specimen of variety *gracilior* Fulton, 1896.

The remaining 18 names, at least so far as the type specimens are concerned, represent slightly different combinations of variations in four characters. Basically, variations in *Amphidromus maculiferus* were recognized because (1) the size was dwarf, small, medium or

large; (2) the color pattern was plain, spotted, or striped; (3) the base color of the shell was yellow, white or brown; and (4) the shell was globose, intermediate or elongated in shape. Obviously, recognition of these classes within the four characters is subjective, and some forms present an intermediate aspect. Particularly in color pattern, further subdivisions can be recognized: Are the spots few or many? Are the stripes regularly linear or zigzag? Are the stripes darker than the ground color or lighter than the ground color (hydrophanous)?

If the holotypes or type figures of the eighteen named forms are classified by the criteria outlined above, a tabular presentation of differences is possible (Table 1). This serves to demonstrate the degree to which different combinations of characters have been used to recognize races and provides a handy frame of reference to measure racial characters as imagined by Bartsch (1917) against the facts of both intra- and inter-populational variations outlined below.

The categories delineated in most sections of Table 1 are arbitrary divisions of a continuum. Specimens of intermediate nature have been indicated by assigning a primary category (solid block) and a minor constituent (striped block) when a mixture of color pattern elements occurs or the shell is not clearly assignable to one of two adjacent divisions. This attempts to avoid the overemphasis of trivial differences that would be implicit if only one block was filled in all cases. It must be emphasized that this table is constructed solely from consideration of the holotypes or type figures. Inclusion of paratypes would have at least doubled the number of striped blocks because of the wide range of inter-populational variation found in this species.

Table 2 summarizes size and shape variation in three populations of *A. maculiferus* from Cotabato Province, Mindanao. Two sets are of color form *cotabatensis*, the third a yellow shell perhaps nearest *inflatus*. Most sets in museums contain only a few specimens, long series having been broken up to use in exchange. The three summarized here apparently represent unselected field samples and quite adequately demonstrate variability.

The difference between the two populations of *cotabatensis* is striking. The range in size of the Colina Hill sample (14.5 mm.) includes three of the size classes in Table 1 and barely misses the fourth. Except for the two "dwarf" races, *apoensis* and *malindangensis*, size variation in the two samples of *cotabatensis* covered the height range of all named forms. In respect to the obesity index (h/d ratio), the most nearly globose type specimen (*cataganensis*) and most elongate

Table 1.—Variations of *Amphidromus maculiferus*

NAMED VARIANT	SIZE		COLOR PATTERN				BASE COLOR		SHELL SHAPE				
	L large 63-72	M medium 56-60	S small 50-53	SPOTS		STRIPES		Y yellow	W white	B brown	G globose	I inter- mediate	E elongate
				A few	M many	R regular	Z zigzag						
<i>apoensis</i>													
<i>bartschi</i> (= <i>webbi</i>)													
<i>basiliensis</i>													
<i>boholensis</i>													
<i>buluanensis</i>													
<i>cataganensis</i>													
<i>cotabatensis</i>													
<i>cosmius</i>													
<i>floresi</i>													
<i>gracilior</i>													
<i>gracillimus</i>													
<i>hidalgoi</i>													
<i>inflatus</i>													
<i>maculiferus</i>													
<i>malindangensis</i>													
<i>multicolor</i>													
<i>samarensis</i>													
<i>strigatus</i>													

(*strigatus* and *gracilior*) ranged from 1.70 to 2.19, respectively. The range in the two sets of *cotabatensis* is 1.66 to 2.11. There is thus no question but that variation within populations essentially blankets the size and shape variation of the named forms.

Table 2.—Variation in Size and Shape in *Amphidromus maculiferus*

	MCZ 138090 Colina Hill, Cotabato	MCZ 48012 Kidapawan, Cotabato	CM (uncata- logued) Saub, Cotabato
No. of specimens.....	32	14	31
Height			
Mean.....	56.4	65.5	55.5
Range.....	49.6-64.1	62.2-71.0	51.4-59.1
S. D.....	2.81	2.52	2.19
Diameter			
Mean.....	30.4	33.2	26.9
Range.....	27.9-34.1	31.3-35.5	24.7-29.4
S. D.....	1.16	1.05	1.03
h/d ratio			
Mean.....	1.85	1.97	2.07
Range.....	1.66-1.99	1.83-2.11	1.91-2.24
S. D.....	0.071	0.083	0.084
Whorls			
Mean.....	6½	6¾	6½
Range.....	5⅞-7	6½-7	6⅓-6⅓

Table 2 also shows that variation between populations of the same color form can reach levels that are statistically significant. Using the simple Coefficient of Difference index, the calculated C.D. of 1.71 indicates a 95 per cent non-overlap in height. Since a 90 per cent non-overlap (index of 1.28) is the conventional borderline for recognition of vertebrate subspecies, the two populations of *cotabatensis* would, on the basis of height, be subspecifically distinct. That there is no necessary correlation between height and obesity is shown by the *inflatus* population, which has the height of the short *cotabatensis* population and the obesity index of the long.

The extent of variation within and between populations in shell size and form makes it questionable to recognize subspecies or species on the basis of single specimens or limited series from either isolated or neighboring localities. Populations in some areas of the species range do seem to have less variation and show a relative homogeneity in shape, but this is a measure of the complexity of variation within the species, rather than an excuse to divide *maculiferus* into several taxa.

Ground color of the shell is equally variable. Basically it is white with a slight yellowish tinge. This can be infused with yellow, resulting in the brightly colored *hidalgoi* and *inflatus*, or brown, resulting in the *buluanensis*, *cataganensis* and *cotabatensis* variations. Specimens from Banzalon (MCZ 88621, 88693, and 88696) and Kapalong (MCZ 111717) near the Davao-Surigao border covered the spectrum of ground color, from the brown suffusion of *buluanensis* (with some spots as in *maculiferus*, sens. str.) to white and finally to bright yellow shells with rust-brown streaks as in *webbi* Bartsch, 1919 (not Fulton, 1907). Populations of some forms, particularly the brown shells, have relatively uniform base color, but so much variation exists that ground color is not a dependable separating criterion.

Color pattern is often relatively stable within populations, although several clear transitions between types were seen in moderately large samples or in small sets from populations in the same general vicinity. The only really plain shell pattern is that of *inflatus*, the other two yellow forms (*webbi* Bartsch and *hidalgoi*) possessing a few rust-brown radial stripes at irregular intervals. Form *buluanensis* possesses the same stripes but differs in the brownish cast to the ground coloration. Typical *maculiferus* has a very few varix-like streaks, a slight brownish cast to the ground color (much less than in *buluanensis*) and scattered rust-brown dots, each one followed by a matching white zone. Both dots and streaks are multiplied greatly in the *cotabatensis* pattern, with the dots more prominent than the stripes. Form *cataganensis* is the reverse of *cotabatensis*, with the dots reduced in number and the radial streaks very broad and close set. In some specimens from Mount Malindang, the streaks become zigzagged on the spire, thus forming a transition to the form *malindangensis*, which has either zigzag dark streaks (holotype) or regular, widely spaced lighter streaks (paratype) over the entire shell. The only differential feature of *malindangensis* is a yellowish cast to the ground color instead of brown as in *cataganensis*. The feature of zigzag radial markings developed in *malindangensis* is also found in another montane form, *apoensis*, and a single clear-streaked shell from Basilan that Bartsch named *basilanensis*. These latter two variations are not necessarily phyletically related to the Mount Malindang population, but they probably represent parallelisms.

Numerous forms—*strigatus*, *gracilior*, *gracillimus*, *floresi* and *apoensis* from Mindanao, *cosmius* and *basilanensis* from Basilan, *multicolor* from Leyte and the Camote Islands, *boholensis* and *samarensis*

—show narrow, regularly or irregularly spaced radial streaks that are clear, hydrophanous, or variously tinted with red-brown or purple. Occasionally the shell will be tinged with light brown instead of being white. Differences between most of these forms are negligible. In *gracilior* and *gracillimus* the markings are milky white, with *gracillimus* a little more slender and the markings a trifle more crowded. Form *strigatus* has streaks with a slight brownish cast and a very few faint brown markings. One individual with heavy "ribbing" and dark stripes was named *floresi*. Surface sculpture in *A. maculiferus* varies within populations from absolutely smooth to low growth wrinkles; *floresi* is based on a moderately sculptured individual and has no other features separating it from the radially streaked variations. As mentioned above, *apoensis* is a montane shell in which the streaks have become strongly zigzagged and broken into spots on the upper part of the whorls. In *basilanensis* the zigzag streaks are clear instead of brownish-red as in *apoensis*; and in *cosmius* from Basilan the clear streaks are confined to the upper portion of the spire. The single shell of *samarensis* has relatively widely spaced brownish radial streaks and a slight brownish tinge to the ground color. Variety *boholensis* is separable from *gracilior* only because the type is slightly smaller and has a brownish cast to the radial streaks. Many specimens of *multicolor* from Leyte have the streaks a light purple in color, but others from the same island (CNHM 41480 ex Moellendorff) have the streaks hydrophanous or reddish-brown. Shells with purple streaks were also seen from Basilan (MCZ 187679).

The above brief summary of variations indicates an extremely complex situation. Populations have been sampled that contain intergrades between any size, shape or base color set of classes, and color pattern is known to vary along several lines or trends of patterning. The named forms are based upon individual combinations of varying characters. The richer assortment of specimens available for study today suggests that most of these names are untenable as taxonomic entities.

Before we attempted to develop a tentative reclassification of the populations of this complex, as a guide to future workers it seemed worth while to list the nomenclatural units available, including their type locality and the particular combination of characters that the name represents. The listing is presented alphabetically.

1. *apoensis* Bartsch, 1917 (Mount Apo, Mindanao); dark zigzag stripes on an elongate shell, ground color white, a few brown spots on upper portion of whorls. Only one specimen known. Proposed as a species.

2. *basilanensis* Bartsch, 1917 (Basilan Island, collected by McGregor); moderately light zigzag stripes on a very small white shell. Proposed as a species. Two specimens known.

3. *boholensis* Bartsch, 1917 (Sevilla, Bohol Island); light brown or hydrophanous radial stripes on a white, elongate shell. Many shells known from type locality and Belar, Bohol. Described as a subspecies.

4. *buluanensis* Bartsch, 1917 (trail between Buluan and Simipatan, Mindanao); irregularly spaced brown radial streaks on a light brown shell. Common near Lake Buluan. Described as a subspecies.

5. *cataganensis* Bartsch, 1917 (Catagan, Mindanao, at 1,100 feet elevation at base of Mount Malindang); dark radial streaks and a few "twin white and red spots" on a brownish-white globose shell. Proposed as a subspecies. Additional material seen by Bartsch shows a complete transition to *malindangensis* (which see) from higher elevations on Mount Malindang.

6. *cosmius* Bartsch, 1917 (Basilan Island); a few hydrophanous radial streaks on the spire of a small yellowish-white shell. Proposed as a subspecies. Only one specimen known.

7. *cotabatensis* Bartsch, 1917 (Cotabato, Mindanao); numerous "twin white and red spots" and a few radial streaks of brownish red on a globose to elongated white or slightly brownish shell. Common in the lowlands of Cotabato Valley. Described as a subspecies.

8. *floresi* Bartsch, 1917 (southeastern Mindanao, collected by I. Flores); dark radial streaks on a white shell that has moderately developed axial ribs on the lower whorls. Described as a species from one specimen without precise locality. A heavily sculptured individual variant.

9. *gracilior* Fulton, 1896 (Mindanao); irregular hydrophanous streaks on a very elongate whitish-yellow shell. A descriptive term of Pfeiffer used in a nomenclaturally acceptable sense by Fulton. Probably *Amphidromus nigrofilosus* Rochebrune, 1882, is a synonym. Known from Mainit, Mindanao.

10. *gracillimus* Kobelt, 1914 (Samal Island off Davao, Mindanao); irregular hydrophanous stripes on a very elongate white shell. Known only from the type lot. Slightly more slender with more crowded streaks than in *gracilior*.

11. *hidalgoi* Bartsch, 1917 (Dapitan, Mindanao); irregularly spaced rust-brown streaks on a lemon-yellow shell with a white subsutural zone. Based on illustrations in an earlier work. Described as a species.

12. *inflatus* Fulton, 1896 (locality unknown); a large, pale yellow shell with white or orange lip. No definite records known. Bartsch (1917, p. 22) correctly pointed out that Fulton (1896, p. 75) erred in listing "Baranda" as type locality. Actually, that was the name of the collector or dealer from whom Hidalgo obtained the type lot. Described as a variety and later made a species.

13. *maculiferus* Sowerby, 1838 (Misamis Province, Mindanao); an elongated shell spotted with matched brown and white patches with a slight brownish cast to the shell. Known from Misamis and Lake Lanao. Described as a species. Variety *obscurus* Fulton, 1896, is a synonym.

14. *malindangensis* Bartsch, 1917 (Mount Malindang, Mindanao, at 3,500-9,200 feet elevation); dark zigzag streaks on a dwarf yellow shell (holotype) or dark radial streaks on a brownish-white shell (paratype). Described as a species from two shells, but linked to *cataganensis* through material also seen by Bartsch.

15. *multicolor* von Moellendorff, 1893 (Bato, Leyte Island); irregularly spaced radial streaks of purple, light brownish red or hydrophanous on an elongated yellow-white or brown-white shell. Many shells are known from southwestern Leyte. Described as a subspecies.

16. *samarensis* Bartsch, 1917 (Samar Island, from the Quadras collection); dark to light radial streaks on a moderately elongated shell with a slight brownish tinge. Only the holotype, from an unspecified locality on Samar, is known. Possibly the locality is incorrect.

17. *strigatus* Fulton, 1896 (Mindanao Island); irregularly spaced hydrophanous or reddish-brown radial streaks on an elongated white shell with a slight brownish cast. Reported from Davao and Surigao. Described as a subspecies.

18. *webbi* Bartsch, 1919 (not Fulton, 1907) (Cabacan, Cotabato, Mindanao); a large, bright yellow elongated shell with a few irregularly spaced reddish-brown varix-like streaks. Described as a subspecies and known only from the original lot. Since the name *webbi* is preoccupied, we propose the name *bartschi* as a substitute.

Reclassification of the above entities is complicated by several factors. Most are known from only a few specimens (or single shells) from one locality. The known localities (see map in Bartsch, 1917, pl. 21) are widely separated, and it is impossible to determine whether the distribution is discontinuous or whether collections from intermediate areas will provide intergrading color patterns. With the limited data available, classification becomes a subjective matter, based upon (1) extrapolation of variability seen in the material in Table 2; (2) assumption that distribution is relatively continuous on Mindanao; (3) assumption that populations sampled in the future will also show variations based upon combinations of the features outlined in Table 1; and (4) deliberate weighing of the importance to be placed upon each varying factor.

Size and shape in the Cotabato populations vary greatly. Although no large samples were seen, all examined specimens of the radially streaked variations from eastern Mindanao and the other islands were elongated in shape. The few specimens seen from the Mount Malindang and Dapitan areas were relatively globose. Size in land snail populations is greatly affected by local environmental conditions and we consider that the dwarf shells are not phyletically related, but come from similar environmental areas.

The base color of the shell is seemingly an independent variable. Populations from Kapalong and Banzalon included white, brown,

and yellow shells, while different types of color patterns were seen on the same background color and the same color pattern occurred on different background colors.

This leaves the color pattern as the factor that shows the least intra-populational variation. On the basis of color variation, we can recognize three basic patterns that tend to form a series of three geographic zones, the outer two consecutively around the central core. The fringe distribution is markedly discontinuous, possibly reflecting a relict pattern; the middle zone is very irregularly shaped; and the central core is represented by three discontinuous areas. Despite this, the overall picture roughly suggests a central core surrounded by two rings. Transition forms are known and possible parallelisms will be noted, but the ring hypothesis presents at least a working model for constructing a classification.

We propose to recognize each zone as a subspecies, calling *forms* any recognizable variants within each zone. Since our subspecies do not have a geographically continuous range, more orthodox systematists might choose to call some of our forms "subspecies." We believe, however, that our nomenclature presents a clearer picture of the possible path of evolution within this species than would the use of many subspecific names.

Our suggested classification is:

Amphidromus maculiferus maculiferus (Sowerby, 1838)

Diagnosis.—Obese to elongated shells with a few to many pairs of overlapping white and reddish-brown dots scattered over the surface of the shell. A Mount Malindang form parallels the color pattern of *multicolor* and some specimens from Banzalon (MCZ 88621) appear to be intermediate between *maculiferus* and *buluanensis*.

Range.—Cotabato Valley, coastal Misamis Province, and Mount Malindang, possibly ranging over to near the coast at the Davao-Surigao border.

Included forms.—*maculiferus* Sowerby, 1838; *cataganensis* Bartsch, 1917; *cotabatensis* Bartsch, 1917; and (?) *malindangensis* Bartsch, 1917.

Remarks.—The Misamis and Lake Lanao *maculiferus* has a few spots and an occasional rust-brown streak. Form *cotabatensis* has the number of dots greatly increased and a few more radial streaks. Form *cataganensis* has many radial streaks and only a few spots. At higher altitudes on Mount Malindang, *cataganensis* is apparently replaced by a form with regular or zigzag radial streaks (*malindang-*

ensis). Not enough material is known of this form to decide its status. Tentatively we are referring it to typical *maculiferus* because of the observed intergradation with *cataganensis*. Zigzag streaks are also found in the Mount Apo population and in one shell from Basilan. We consider that the zigzag nature of the markings is independently derived in each case, although possibly further study will reveal that they are monophyletic. Since the three forms are known from four specimens, any conclusions as to affinities must be tentative.

Amphidromus maculiferus buluanensis Bartsch, 1917

Diagnosis.—Generally moderately elongated shells with a few irregularly spaced, varix-like reddish-brown radial streaks on the lower whorls. Body color yellow, white or brown.

Range.—Discontinuous on Mindanao. Known localities are Dapitan, Zamboanga (*hidalgoi*); Cabacan (*bartschi*), Saub, and vicinity of Lake Buluan (*buluanensis*), Cotabato; Banzalon and Kapalong near the Davao-Surigao border.

Included forms.—*buluanensis* Bartsch, 1917; *hidalgoi* Bartsch, 1917; *bartschi* Laidlaw and Solem, 1961 (= *webbi* Bartsch, 1919, not Fulton, 1907).

Remarks.—The few radial stripes are the constant feature, with the base color varying. In *buluanensis* it is brown or yellow; in *hidalgoi* yellow with a white subsutural zone; and in *bartschi* yellow with no subsutural zone. Material from Banzalon and Kapalong is primarily this color variation, although a few shells show the spots of *maculiferus*. Some specimens from the Catagan-Mount Malindang area suggest that intergrades between *maculiferus* and *buluanensis* may occur in this region. The specimens from Saub, Cotabato, mentioned above (see Table 2) are pure yellow without radial streaks. They are included here with some hesitation. Possibly *inflatus* Fulton, 1896, should be placed here, but until a definite locality is known for that variation we choose to leave its position undesignedated. If lumped with *buluanensis*, the name *inflatus* would take precedence.

Amphidromus maculiferus multicolor von Moellendorff, 1894

Diagnosis.—Irregularly spaced radial streaks of purple, reddish-brown or hydrophanous character are distributed over the spire or the entire shell. Base color may be white, faintly brown or light yellow. Shell generally quite elongated and large.

Range.—Basilan, southeast and northeast Mindanao, southern Leyte, Bohol, Basilan and possibly Samar.

Included forms.—*multicolor* von Moellendorff, 1894; *gracilior* Fulton, 1896; *strigatus* Fulton, 1896; *gracillimus* Kobelt, 1914; *boholensis* Bartsch, 1917; *samarensis* Bartsch, 1917; *cosmius* Bartsch, 1917; *apoensis* Bartsch, 1917; *basilanensis* Bartsch, 1917; and *floresi* Bartsch, 1917.

Remarks.—Even the most cursory examination of museum material reveals that the majority of the included forms are not recognizable as more than individual variations. Shells with purple streaks were seen from Leyte, Bohol and Basilan, but not from Mindanao. Since other specimens from these three islands, however, had the hydrophanous or reddish-brown bands of the mainland Mindanao populations, this tendency for purple banding can at most be considered an incipient trend. The minor differences between the types of *multicolor*, *gracilior*, *gracillimus*, *strigatus*, *boholensis* and *samarensis* are outlined above (see p. 543). Material in museum collections does not support their distinctness even as forms, and we consider that they are synonymous. The form described as *cosmius* is a little less elongated and the pale markings are confined to the spire; *floresi* is also less elongate and has relatively heavy surface sculpture with dark axial bands; *apoensis* has zigzag brown bands that are reduced in prominence just below the suture; and *basilanensis* has narrow, zigzag axial streaks, light brown in color, although fewer in number than on most shells examined. The last four named variations are known from five specimens, so that it is impossible to decide whether they are individual variations or representative of variant populations.

The above classification into three subspecies is based upon the trends in color pattern of (1) radial streaks distributed over the entire shell (*multicolor*); (2) varix-like radial streaks very irregularly spaced on the lower whorls (*buluanensis*); and (3) development of white and reddish coupled spots (*maculiferus*). Generally the *multicolor* specimens are quite elongated, although the Basilan Island *cosmius* and *basilanensis* are much less attenuated. Specimens of *maculiferus* and *buluanensis* range from globose to very elongated, but the Mount Malindang and Zamboanga shells tend toward the globose in shape (*hidalgoi*, *cataganensis*, *malindangensis*). Zigzag radial markings have developed three times, two (*malindangensis* and *apoensis*) on mountains and one (*basilanensis*) on an island. Purple streaking is found on Leyte, Bohol and Basilan, but not on Mindanao shells (at

least in present collections). The above detectable trends in variation all present factors to be investigated for possible evolutionary importance and use in establishing a more firmly based classification than the one tentatively outlined above.

X. GROUP OF *Amphidromus martensi* Boettger, 1894

Moderately large (36–60 mm. high), imperforate shells with a swollen spire, very thin and transparent parietal callus. Color orange-yellow or yellow with or without spiral zones or parietal color patches.

Remarks.—The three species grouped below agree in shape, closed umbilicus, and shell structure. *A. entobaptus* (Dohrn, 1889) is orange-yellow or yellow without darker markings; *A. similis* Pilsbry, 1900, is yellow with a few brown subsutural spots and the parietal and umbilical calluses are purple-brown in color; *A. martensi* Boettger, 1894, has spiral green bands and zones, although an occasional individual shows only the yellow ground color.

***Amphidromus (Amphidromus) entobaptus* (Dohrn, 1889)**

Range.—Palawan and the Calamianes group, with a single shell reported from Mindoro.

Remarks.—The obese form, closed umbilicus, whorl increment, aperture and lip conformation all suggest that *A. entobaptus* is derived from the Bornean *A. martensi*. The most obvious feature of *A. entobaptus* is the deep orange-yellow coloration that is apparently unique among *Amphidromus* in that the pigment extends into the middle layers of the shell. Even very worn specimens show a considerable amount of coloration. A very few whitish shells were seen, but most have the rich orange-yellow tone shown in most illustrations.

Amphidromus entobaptus is apparently widely distributed on Palawan; specimens from Puerto Princesa (USNM 311065, USNM 311224, CNHM 54945), Aborlan (USNM 472723), Tay-Tay (USNM 311298), Poncal (USNM 254918), and Ulugan (USNM 254917) were examined during this study. The shells are relatively large (45–55 mm. high) with a distinctly inflated body whorl. Table 3 summarizes the variation in a population from Ulugan Bay (USNM 254917).

The Palawan shells appear to be consistently larger and with a more inflated body whorl than populations from islands in the Calamianes group. The latter range from 36 to 50 mm. high and have the body whorl less inflated than the Palawan shells. Several races have been described from the Calamianes group: *viridoflavus*

Table 3.—Size Variations in *Amphidromus entobaptus*

	MCZ 35416 <i>busuangensis</i>	MCZ 96716 <i>coronensis</i> (= <i>contractus</i>)	USNM 215642 <i>cilionensis</i>	USNM 215599 <i>linapacensis</i> (= <i>gracilis</i>)	USNM 215600 <i>viridoflavus</i>	USNM 254917 <i>entobaptus</i>
No. of specimens	6	7	21	25	6	25
Height						
Mean	42.8	41.1	43.4	43.8	44.7	50.25
Range	38.5-48.1	37.2-45.3	36.4-48.2	39.2-49.9	41.7-46.5	46.2-55.2
S. D.	3.42	2.87	3.24	2.94	1.57	2.25
Diameter						
Mean	24.1	23.3	24.8	23.8	24.6	28.95
Range	21.8-25.8	21.6-24.3	22.6-27.1	21.3-25.8	23.2-25.8	25.6-32.4
S. D.	1.36	0.83	1.24	1.18	1.13	1.44
h/d ratio						
Mean	1.78	1.76	1.75	1.83	1.82	1.77
Range	1.70-1.90	1.64-1.90	1.54-1.87	1.68-1.96	1.76-1.92	1.64-1.88
S. D.	0.064	0.080	0.076	0.082	0.052	0.065

Bartsch, 1917, from Malubutglubut Island; *gracilis* Kobelt, 1916 (= *linapacensis* Bartsch, 1917), from Linapacan Island; *cilionensis* Bartsch, 1917, from Culion Island; *contractus* Kobelt, 1916 (= *coronensis* Bartsch, 1917), from Coron Island; and *busuangensis* Bartsch, 1917, from Busuanga Island. Variation in Bartsch's type sets is summarized in Table 3.

Average differences between the populations in height and diameter are negligible, being a matter of a millimeter or two at most. The form from Linapacan Island (*gracilis*) does average a trifle more slender than the other populations, but the largest coefficient of difference (0.51) is well below the conventional subspecific level. The alleged difference was magnified by Bartsch's selecting the largest and most slender shell available to him as type of *linapacensis*. The range of individual variation on each island far outstrips the minor average differences and we have no hesitation in uniting all of the Calamianes races into one subspecies, utilizing the earliest available name (*contractus* Kobelt, 1916).

Amphidromus entobaptus contractus differs from the nominate race in its smaller average size and less inflated body whorl.

One more name needs consideration. *Amphidromus mindoroensis* Bartsch, 1917, was based on a single shell collected by Mr. Weber of the Philippine Bureau of Science and labeled "Mindoro Island." The only known specimen is large (53.2 mm. high), canary yellow, and has a rather obese shape. Except for the locality, it could be taken as a specimen of *Amphidromus e. entobaptus* from Palawan. If the Mindoro record is confirmed, possibly the Calamianes race *contractus* represents only the well-known small island dwarfing effect on molluscan species. Certainly there are no criteria to justify specific, or even subspecific separation of *mindoroensis* from typical *entobaptus*.

Amphidromus (Amphidromus) martensi Boettger, 1894

Range.—Mount Kinabalu to at least 4,900 feet elevation plus coastal areas in the Sandakan and Kinabatangan Districts, North Borneo, and Baram District, Sarawak, with variety *capistratus* von Martens, 1903, from Kutei Sultanate, East Borneo.

Remarks.—The two continuous olive-green spiral bands on the last whorl, the whitish subsutural zone, the yellowish-green ground color, the swollen spire, and the relatively obese shape immediately identify this species. The umbilicus is imperforate in all specimens and the spiral bands appear as reddish-purple streaks inside the aper-

ture. Some specimens show traces of banding on the upper whorls. One shell in a set from the Baram District (ANSP 130252) lacks any color bands, although other members of the same lot are normally colored. The variety *capistratus* von Martens, 1903, is only a slight color variant.

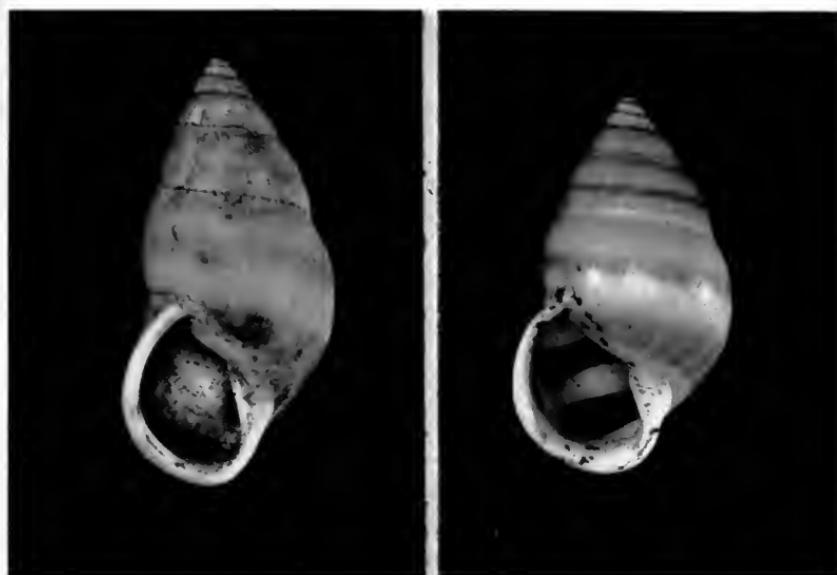


FIG. 20. *Amphidromus martensi* Boettger. Dermakot, Kinabatangan District, North Borneo; collected by R. F. Inger. CNHM 57031.

In 1937 J. A. Griswold collected several sets from different altitudes on Mount Kinabalu (MCZ 112227-112232). The 24 adult shells ranged in height from 43.1 to 52.9 mm. (mean 46.3 mm.) with an h/d ratio range of 1.56 to 1.73 (mean 1.66). Populations from different altitudes on Mount Kinabalu showed no measurable differences in height, diameter or h/d ratio. Most of the material from lowland Kinabatangan and Sandakan Districts (CNHM 38107-38109, CNHM 57031) is similar in size and shape (height 44.6-49.1 mm.; h/d ratio 1.69-1.72), but one specimen from Dermakot, Kinabatangan (CNHM 57031), is quite elongate (see fig. 20), being 50.5 mm. high, h/d ratio 1.90.

Amphidromus (Amphidromus) similis Pilsbry, 1900. Figures 15, A, and 21.

Range.—Mount Dadap and Mount Sekadau, Borneo; Kampong Tapu and Sadong, Sarawak.

Remarks.—Only dextral shells are known. The yellow ground color, the broad white subsutural zone, the few subsutural brown spots and the purplish-brown parietal callus are distinctive. There is no varix, the umbilicus is closed and the peristome is white. The general color pattern is nearly identical with that of *A. atricallosus*, but the absence of a varix and the shape suggest that this is a parallel color development and has led to our grouping *A. similis* with the *martensi* complex.

Only eight specimens of this species are known: two in the British Museum (Natural History), four in the Rijksmuseum van Natuurlijke Historie, and two in the Museum of Comparative Zoology. The five adult shells in the latter two collections were 44.1–48.8 mm. high (mean 47.2), h/d ratio 1.61–1.90 (mean 1.77), with $6\frac{1}{8}$ to $6\frac{5}{8}$ whorls (mean $6\frac{3}{8}$).

Nomenclatural details concerning this species are discussed in the alphabetical list below.



FIG. 21. *Amphidromus similis* Pilsbry; paratype. Mount Dadap, Borneo; collected by Moret. Rijksmuseum van Natuurlijke Historie, Leiden.



FIG. 22. *Amphidromus palaceus* var. *tener* von Martens. At Tjibodas, Java, 4,000 feet elevation. CNHM 72405 ex Fulton.

XI. GROUP OF *Amphidromus palaceus* (Mousson, 1848)

Relatively thin-shelled, perforate species with a generally thin parietal callus, surface shiny or ribbed, monochrome coloration or very highly colored.

Remarks.—The perforate umbilicus, relatively simple reflected lip, and generally thin shell ally these species despite their divergent sculpture and color. The Javanese and Sumatran *A. palaceus* and the Javanese *A. winteri* are much heavier, thicker shells and more strongly ribbed than the *webbi-enganoensis-banksi* complex from the satellite islands. The latter show only slight traces of sculpture and are much thinner, lighter shells with more brilliant coloration. Despite the variation in weight, color, and texture, the form of these species is so similar that we have little hesitation in considering them to be closely allied. The reason for the lighter, thinner, more colorful shells on the smaller islands is unknown. The Celebesian *A. beccarii* is superficially similar to *palaceus* but seems to be a parallel development from the *sinistralis* complex (see p. 575).

Amphidromus (Amphidromus) palaceus (Mousson, 1848). Figure 22.

Range.—Sumatra, west and central Java, Madura, Nusa Kambangan.

Remarks.—The slightly swollen spire, reflected white lip and white callus, low and indistinct ribs, and monochrome green, yellow or brownish base with occasional varices or vertical color zones are quite distinctive. The related *A. winteri* (CNHM 72425) has much heavier, very distinct sculpture, and a narrower spire and body whorl (h/d ratio 1.92) than *A. palaceus* (CNHM 72426, h/d ratio 1.77).

Several variations of *A. palaceus* have been given names. Variety *appressus* von Martens, 1867, is more elongate-conic (approaching the shape of *winteri*) with a yellow color and the suture distinctly margined below; variety *purus* Mousson, 1849 (CNHM 75797 from Palimanan, Java, collected by Paravicini), has a much broader peristome, heavier sculpture, and a white (CNHM 72399), pink (CNHM 75797), or yellow (CNHM 72399) color; variety *subaurantia* von Martens, 1867, has a pinkish or dilute orange shell with a reddish-brown peripheral band; variety *tener* von Martens, 1867 (CNHM 41478, CNHM 72405), is a thin, delicate shell (fig. 22) whose identity and relationship are uncertain. The figured shell (CNHM 72405) from 4,000 feet elevation at Tjibodas, Java, was received from Fulton as *tener*. It appears to be a very thin-shelled variant of *palaceus*, and, despite the closed umbilicus, is retained in this species.

Amphidromus (Amphidromus) winteri (Pfeiffer, 1849)

Range.—Java.

Remarks.—The slender shape and very heavy sculpture mentioned above immediately separate this from *A. palaceus* in the material studied. It is possible that *palaceus* and *winteri* may be extreme variations of one species, but presently it seems best to leave them as distinct forms. A variation in which the peristome is greatly expanded was given the name *inauris* Fulton, 1896. Pilsbry (1900) considered it to be a subspecies, but van Benthem Jutting (1950, p. 486) implied that it is only a variety.

Bulimus teysmanni Pfeiffer, 1871, which was described without any precise locality, appears to be a squat, thin-shelled inflated relative of *palaceus*, *winteri*, and *webbi*. Possibly the name was based on a monstrosity. Present information is insufficient to decide its status, but it probably should be left as a "variety" of *A. winteri*.

Amphidromus (Amphidromus) enganoensis Fulton, 1896

Range.—Engano Island and its satellite, Pulau Dua, off the west coast of Sumatra.

Remarks.—A sinistral, openly umbilicated shell that is variable in color, the ground tone being olive-yellow or brown, with irregular olive streaks or reddish-brown bands as patterning. It is relatively obese. One set seen by van Benthem Jutting (see under *enganoensis* in alphabetical list, for citation) contained 8 dextral and 41 sinistral shells. The name *sykesi* Fruhstorfer, 1905, refers to the spirally banded color phase in the Engano population, while the subspecific name *fruhstorferi* Laidlaw, 1954 (= *gracilior* Fruhstorfer, 1905, not Fulton, 1896), covers the population on Pulau Dua. Shells from Pulau Dua (CNHM 72408) were 33.8–39.7 mm. high, compared with 49–54 mm. high for the Engano specimens. This appears to be a typical small island dwarfing effect, and the name *fruhstorferi* may be unnecessary. *A. enganoensis* differs from *A. webbi* in having much more convex whorls and a much more broadly reflexed columella. Otherwise the two species are closely related.

Amphidromus (Amphidromus) webbi Fulton, 1907. Figure 23.

Range.—Pulau Babi, Nias Island, Simalur, Pulau Lekon, and the Mentawi Chain off Sumatra.

Remarks.—The nominate race is known only from the original collection on Nias Island. A probable paratype is CNHM 72412. Two races from other satellite islands of Sumatra were named *babiensis* Laidlaw, 1954 (a paratype is CNHM 72411), and *simalurensis* Laidlaw, 1954 (fig. 23), after their type localities. They, together



FIG. 23. *Amphidromus webbi simalurensis* Laidlaw; holotype. Simalur Island, Mentawi Islands. Photograph by courtesy of Rijksmuseum van Natuurlijke Historie, Leiden.

with an unnamed form from the Mentawi Chain, differ in only minor respects from the nominate subspecies.

Both *A. webbi* and *A. enganoensis* appear to be thin-shelled, more globose derivatives of the Java-Sumatra *A. palaceus*.

Amphidromus (Amphidromus) banksi Butot, 1954

Range.—Pulau Panaitan, off the west end of Java.

Remarks.—A sinistral, highly colored shell with perforate umbilicus, thin recurved lip and very thin transparent parietal callus. The aperture is generally dark violet, and the color pattern, although variable, shows traces of spiral zonation. The lip is white or tinted.

A. banksi differs from *A. enganoensis* in having a narrower umbilical perforation and more rounded whorls. The *perversus* complex

has a very thick recurved lip and a generally closed umbilicus. Possibly *Bulimus virescens* Swainson, 1822, is this species, but the available evidence is inconclusive (see p. 669).

XII. GROUP OF *Amphidromus inversus* (Müller, 1774)

Range.—Shell moderately large (50 mm. high), amphidromine, whitish, surface dull with brown streaks and zones or varices. Lip strong and reflexed, often appressed to the preceding whorl.

Amphidromus (Amphidromus) inversus (Müller, 1774)

Range.—Annam, Cambodia, Thailand, Malaya, Sumatra, Borneo, Celebes, and many satellite islands. It is absent from Java, the Mentawi Chain, Panaitan and the Lesser Sunda Islands.

Remarks.—*A. inversus* is variable in size (45–55 mm. high) with 6½ to 8 whorls. The upper whorls have a suprasutural spiral fillet of dark brown that is sometimes pronounced toward the apex. Later whorls usually have irregularly spaced, unwaved radial brown bars and almost always one or more varices. The columellar whorl is dull brown, showing externally as a sharply defined zone of brownish tinge around the lower half of the body whorl. A heavy whitish callus overlies the dark coloring of the parietal wall.

Published records and available material are not sufficient to fully delineate the range and areas of overlap among several subspecific populations. On the basis of available data, it seems possible to recognize four subspecies:

Amphidromus inversus inversus (Müller, 1774)

Range.—Malaya, Sumatra and islands in the Java Sea. Although found on Pulau Klappa, Duizend Islands, Klein Kombuis, and formerly on Krakatau, it is not known from Java.

Remarks.—Relatively large (50–55 mm. high), elongate and with a slender spire. Common near Singapore (CNHM 72417).

Amphidromus inversus andamensis (Pfeiffer, 1871)

Range.—Borneo, Billiton and its satellite islands; Penebangan, Karimata Islands; Sirhassen and Bunguran, Natuna Islands; and Pulau Bunda, Lambelan Islands.

Remarks.—Generally smaller (33–48 mm. high) and with a more flame-like color pattern than the nominate subspecies. Many Bornean records are cited by Pilsbry (1900, p. 167). Specimens from

Pulau Rotan, southeast of Billiton (Leiden Museum, CNHM 72406), averaged about 38 mm. high; 17 specimens were dextral, 21 sinistral. In some shells the dark zone of the body whorl was almost black. The Leiden Museum also has material from Pulau Marani (northeast of Billiton). Material from Sarawak (CNHM 72407) was obtained from Fulton.

Amphidromus inversus annamiticus (Crosse and Fischer, 1863)

Range.—Lower Mekong Valley of Cambodia, Annam and Thailand.

Remarks.—The ground color is pale brown and the dark zone of the body whorl is paler than in typical *inversus*. Color form *roseotinctus* von Moellendorff, 1894, seen from Tschaya, Thailand (USNM 195850), lacks the dark fillet of the upper whorls and the spire is tinted pink.

Amphidromus inversus koperbergi, new subspecies. Figure 24.

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden.

Type locality.—Menado, North Celebes; collected by Dr. Koperberg.

Diagnosis.—A large, flat-sided shell with bright chestnut dark zone and feebly marked radial bars.

Description.—Shell large (50–63 mm. high), dextral with eight whorls. Spire elongate, flat-sided, not swollen. Junction of outer and columellar lip angled. Color light brown with dark zone of last whorl bright chestnut.

Remarks.—Known only from six specimens. One paratype is CNHM 97805.

The above subspecies are rather weakly characterized and may be reduced to varietal status when more localized collections are available for study. *Bulimus contusus* Reeve, 1848, *B. elongatus* Hombron and Jacquinot, 1854, and *B. jayanus* Lea, 1841, are synonyms of *Amphidromus i. inversus*.

Amphidromus (Amphidromus) javanicus (Sowerby, 1841)

Range.—West Java.

Remarks.—This is a relatively large (50–75 mm. high) shell with thin reflected peristome and narrow, dull crimson, chestnut or even blackish radial streaks. There is a moderately heavy white parietal callus, the surface of the shell is striate and the umbilicus is closed. *Bulimus loricatus* Pfeiffer, 1855, is a synonym of *Amphidromus javanicus*.



FIG. 24. *Amphidromus inversus koperbergi*, new subsp.; holotype. Menado, North Celebes. Photograph by courtesy of Rijksmuseum van Natuurlijke Historie, Leiden.

Amphidromus (Amphidromus) *heerianus* (Pfeiffer, 1871)

Range.—Java and Meeuwen Island.

Remarks.—Color and form vary considerably, but the distinctly striated surface, thickened and reflected peristome, small umbilical opening and swollen spire separate this species from *javanicus* and the *winteri-palaceus* complex. Both *heerianus* and *javanicus* have usually been associated with *winteri* and *palaceus* because of the striate shell, but the shape, umbilicus, and solid structure led us to consider them the Javanese replacements of *A. inversus*. Two varieties have been named: *poecilus* van Benthem Jutting, 1941, from

Java and Meeuwen Island has irregular stripes and blotches of a pink or purplish tint; variety *robustus* Fulton, 1896, is relatively large and whitish and usually has four spiral brown color bands.

XIII. GROUP OF *Amphidromus alticola* Fulton, 1896

Rather small (32–39 mm. high), amphidromine, thin, yellow shells without variees. Umbilicus closed or barely perforate; lip slightly thickened and expanded, but not truly reflected.

Amphidromus (Amphidromus) alticola Fulton, 1896

Range.—Mountains in West Java; 1,400–2,000 meters elevation.

Remarks.—The affinities of *alticola* are uncertain. The yellow or orange shell with wide or narrow white subsutural zone and angled aperture is distinctive. In some respects, specimens labeled "Java" (AMNH 52981, AMNH 53167, AMNH 53195) seem to be miniature, slightly distorted *A. palaceus* var. *tener*. Possibly *A. alticola* is derived from the *palaceus* complex, but more data are needed. Material labeled "Boesak, Celebes" (Leiden Museum, CNHM 72364) may represent mixed labels rather than a valid locality record.

SYNDROMUS (Groups XIV through XIX)

XIV. GROUP OF *Amphidromus xiengensis* Morlet, 1891 (main-land species)

Amphidromus (Syndromus) moniliferus (Gould, 1846)

Range.—Tavoy, Martaban and Yangtaw, Burma; one shell from Samui Islands off Thailand.

Remarks.—Although this species is usually placed with the *glaucolarynx* series, the color pattern, size and shape suggest that it may be an occasionally dextral, northern representative of the *xiengensis* complex. *Bulimus theobaldianus* Benson, 1857, is a color form with a spiral peripheral fillet and a lighter basal portion of the body whorl. Both variants have narrow radial flames not quite reaching the periphery.

Amphidromus (Syndromus) flavus (Pfeiffer, 1861)

Range.—Known from Luang-Prabang, Laos; Thu-Dan-Moth and Long-ho arroyo near Ving-Long, Cochinchina; and Tebing Tinggi, north of Kangar, Perlis, Malaya. Described from "Siam" but no material with exact locality data is known from Thailand.

Remarks.—The shell is uniform sulphur yellow, occasionally with a single basal reddish band near the columella (CNHM 72361 ex Fulton from Laos). *Amphidromus fultonianus* Laidlaw, 1930 (= *fultoni* Laidlaw, 1929, not Ancey, 1897), was described from a single shell collected at Singgora, Thailand. Probably it is a synonym of *A. flavidus*. Actually, we have insufficient material to evaluate the *xiengensis* series and the several species may well prove to be color phases of one species.

Amphidromus (Syndromus) zebrinus (Pfeiffer, 1861)

Range.—Known from the type collection in "Siam."

Remarks.—The white shell is ornamented with rather wide, nearly straight or somewhat waved black-brown stripes. *A. eudeli* Ancey, 1897 (= *fuscolabris* von Moellendorff, 1898), from Binh-Dinh, Annam, is slightly larger, with a red subsutural line, wider stripes and a purple peristome. Probably it is a color phase of *A. zebrinus*, but it might belong to the *mouhoti* sequence.

Amphidromus (Syndromus) areolatus (Pfeiffer, 1861)

Range.—Known from the type collection in "Siam."

Remarks.—This shell is irregularly painted with slanting brown flames which branch above, has a reddish patch near the columella, and probably is only a color phase of *A. zebrinus*. *Bulimus mouhoti*, *flavus*, *zebrinus* and *areolatus* were described on the same page with the locality "Siam." In view of the great variability found in the Philippine Island *quadrasi* and on Timor (Haniel, 1921), the validity of these species seems dubious, but the material needed to show intergradation is unavailable.

Amphidromus (Syndromus) semitessellatus Morlet, 1884

Range.—Known from several localities in Cambodia and Srakeo, Thailand.

Remarks.—There is a subsutural band of black or purple and two interrupted spiral bands of brown on all but the last whorl, which is solid yellow, occasionally with spiral basal bands.

Amphidromus (Syndromus) xiengensis Morlet, 1891

Range.—Laos and Cambodia.

Remarks.—The basic color pattern of *A. xiengensis* consists of narrow to moderately wide brown radial bands that are interrupted

by one or more narrow spiral zones of ground color. Most varieties have a red subsutural band present. The nominate form has only peripheral and subperipheral color interruptions, while variety *multifasciata* Fulton, 1896, has four spiral yellow zones, two above the periphery. Variety *clausus* Pilsbry, 1900, has the radial streaks obsolete on the body whorl and, in the type material, a nearly closed umbilicus, although a specimen from Lampoon, Thailand (CNHM 72396), has an open umbilicus and the color pattern of *clausus*. Variety *proxima* Fulton, 1896, was described as a variant of *A. flavus*, but appears to be an even more decolored example of what Pilsbry named variety *tryoni* Pilsbry, 1900. Both *proxima* and *tryoni* have basal bands and only a few red dots on the upper whorls. In *proxima* the reduction has been carried further than in *tryoni*.

No large unsorted collections of this complex were seen, and it is thus impossible to judge the relationship of the named color forms.

Amphidromus (Syndromus) fultoni Ancey, 1897

Range.—Described from material collected in "Cochinchina."

Remarks.—A much more obese shell with a few dots on the third whorl, two very narrow basal bands, and a subsutural whitish band. It is not known from an exact locality.

XV. GROUP OF Amphidromus porcellanus (Mousson, 1848) (Java and Sumatra, Andaman and Nicobar Islands)

Amphidromus (Syndromus) porcellanus (Mousson, 1848)

Range.—West Java, Krakatau and Sebesi Islands. An old record from Deli, Sumatra, was probably based on examples of *Amphidromus sumatranaus*.

Remarks.—The shell is ornamented with relatively narrow radial flames which are usually interrupted by a clear spiral peripheral zone. The base has spiral dark bands and the subsutural zone is white or yellow. It is quite common near Buitenzorg (CNHM 72391, CNHM 97364).

Amphidromus (Syndromus) furcillatus (Mousson, 1849)

Range.—Java, Bali, Andaman and Nicobar Islands.

Remarks.—In the nominate race, there is a pink or yellow zone bordering the last two whorls and the radial color bars are often very oblique and distinctly forked at the top. Two color phases

are common. Typical *furcillatus* (of which variety *flammulatus* von Martens, 1867, is a synonym) has the radial flames continuing to the aperture, and variety *virescens* von Martens, 1867, has the flames replaced at least partially by diagonal, narrow green lines (CNHM 72390, from Malang, Java). *Bulimus elegans* Mousson, 1849 (not Pfeiffer, 1848), is a prior name for *furcillatus* Mousson, 1849.

Shells found on the Andaman and Nicobar Islands have variously been referred to a separate species or a subspecies of different Indonesian taxa. With some hesitation we are considering them to be a subspecies of *furcillatus*. Specimens from the Andaman Islands (CNHM 72385, CNHM 97354) have the subsutural zone and flames of *furcillatus*, with some specimens showing the *virescens* pattern on later whorls. They differ in having the flames solid on top and not forked. These were described as *Bulimus andamanicus* Hanley and Theobald, 1876. The variety *nicobarica* Godwin-Austen, 1895, from Katchall, Nicobar Islands, was described as "larger than Andaman shells, and in colour is far paler and with few markings, and those pale." A shell labeled "Nicobar Islands" (CNHM 97352) is only 24.7 mm. high and differs in pattern from the Andaman shells in having the flames forked above. In this respect it resembles the Javanese *furcillatus* more than the Andaman *andamanicus*. More material is needed to assess its status fully, and we are tentatively leaving *nicobarica* as a variety of *andamanicus*.

Amphidromus (Syndromus) *filozonatus* (von Martens, 1867)

Range.—Eastern and central Java, Madura, and Bawean Islands.

Remarks.—At times it is difficult to decide whether a specimen shows brown spiral zones on a light background, or light spiral zones on a brown background. *A. filozonatus* differs from both *porcellanus* and *furcillatus* in having a primarily spiral as opposed to a primarily radial pattern. A probable paratype of *A. filozonatus baweanicus* Fruhstorfer, 1905, from Bawean Island (CNHM 72392 ex Fulton) differs from typical *filozonatus* from Grissee, near Surabaja, Java (CNHM 72363), only in being slightly smaller and more intensely colored. It is at best a weakly differentiated subspecies.

Amphidromus (Syndromus) *sumatranus* von Martens, 1864

Range.—Sumatra, Nias and Simalur Islands.

Remarks.—A slender, highly polished, smooth shell with a highly variable color pattern. Basically, the color pattern consists of two

brown basal bands and a yellow background, with one or two white spiral bands with brown spots. Rensch considered that typical *sumatranus* was restricted to middle Sumatra and that material from north Sumatra represented a subspecies, *atjehensis* Rensch, 1934. We follow van Benthem Jutting (1959, p. 165) in considering *sumatranus* and *atjehensis* synonymous. Specimens from Mount Singalang on the west coast of Sumatra have the lower row of spiral spots prolonged into radial flames on the last whorl and form a possible subspecies *singalangensis* Rolle, 1908.

Specimens from Simalur Island and Pulau Babi were called variety *jacobsoni* Laidlaw, 1954. They are shorter and more globose than the Nias race, and some show the color pattern of variety *sowerbyi* and others that of typical *sumatranus*. The holotype has narrow radial flames developed on later whorls. Whether this is a color variety or a valid subspecies remains uncertain.

The Nias Island population contains two extreme color variations which were described as separate species. The phase *niasensis* Fulton, 1907, has the usual radial flames partially broken by spiral clear zones, while the phase *sowerbyi* Fulton, 1907, has a color pattern of spiral brown lines. Extensive material from Nias Island of *niasensis* (CNHM 41488 and CNHM 97367) and *sowerbyi* (CNHM 41491, CNHM 62797, CNHM 72402 and CNHM 97365) shows intergradation between the color phases. The Nias population might be considered a weakly characterized subspecies of *sumatranus*, although available material is insufficient to evaluate the affinities of the Sumatran and Nias populations.

Amphidromus (Syndromus) semifrenatus von Martens, 1900

Range.—Sumatra.

Remarks.—The color pattern shows affinities to both *porcellanus* and *sumatranus*, but *A. semifrenatus* differs by having a narrow black or brown band that winds around the insertion of the columella and is continued into the aperture above the columellar insertion. Several color varieties have been described but not named, and many shells cannot be fitted into any of the listed variations. Specimens from Atjeh, Sumatra (CNHM 72388), have prominent flames on the upper whorls that disappear below.

Amphidromus (Syndromus) ilsa B. Rensch, 1934

Range.—Pulau Weh and Atjeh, Sumatra.

Remarks.—The Sumatran record is based on shells in the Leiden Museum collected by van Heurn at Sabang, Atjeh. *A. ilsa* is unbanded and has a reddish columellar streak similar to the band found in *semifrenatus*. It is characterized by its very globose shape and lack of banding.



FIG. 25. *Amphidromus latestrigatus* Schepman; holotype. Sumba Island. Photograph by courtesy of Rijksmuseum van Natuurlijke Historie, Leiden.



FIG. 26. *Amphidromus reflexilabris* Schepman; holotype. Amarassi, West Timor. Photograph by courtesy of Rijksmuseum van Natuurlijke Historie, Leiden.

XVI. GROUP OF *Amphidromus latestrigatus* Schepman, 1892 (Sumba, Flores, Sumbawa)

***Amphidromus (Syndromus) latestrigatus* Schepman, 1892.** Figure 25.

Range.—Flores, Sumba and possibly Bali.

Remarks.—Three of the many color variations of this species have been named. Typically they are rather easily separable, but

enough intergrading individuals have been found to show that they are variants of one species. Typical *latestrigatus* (fig. 25) has broad radial flame-like markings and a roseate aperture (CNHM 72366 and CNHM 97359 from Sumba). Variety *sumbaensis* Fulton, 1896, usually has the flame markings partially forked above and very irregular and obscured on the lower whorls. Often it is very difficult to separate *sumbaensis* and *latestrigatus*. Variety *consobrinus* Fulton, 1897, from south Flores (CNHM 72365, type lot) has the color pattern reduced to one or two spiral bands on later whorls, with the lip and apical patches red. All forms have been found on Sumba, but only *consobrinus* on Flores.

Rensch identified two shells from Bali (now in the Berlin Museum) as *A. latestrigatus*. This record needs confirmation.

Amphidromus (Syndromus) floresianus Fulton, 1897. Figure 16, C.

Range.—South Flores and Laora, northwest Sumba.

Remarks.—*A. floresianus* has a purple or black lip, 7 to $7\frac{1}{2}$ whorls, and a color pattern of spiral markings on the last whorl; height 41–48 mm. *A. latestrigatus* has a rose- or pink-colored aperture, 6 to $6\frac{1}{2}$ whorls (the two Bali shells have $7\frac{1}{4}$ whorls), and no spiral markings on the last whorls; height 26–37 mm. *A. poecilochrous* Fulton, 1896, from Sumbawa (CNHM 72394) has a color pattern almost identical with that of *floresianus*, but differs by its smaller size (25–36 mm.), white or buff apex and lip, 6 to $6\frac{1}{2}$ whorls, and narrow black or brown subsutural line. The effect of the *floresianus* and *poecilochrous* color patterns is almost identical.

Amphidromus (Syndromus) poecilochrous Fulton, 1896. Figure 16, A.

Range.—Sumbawa Island.

Remarks.—*Amphidromus poecilochrous* was considered to be a subspecies of *A. contrarius* by Rensch (1932, pp. 97–98), but we believe that this is unlikely. The *poecilochrous*–*latestrigatus*–*floresianus* complex may prove to be variants of one species, but the color patterns of the Timor *contrarius* group are constructed quite differently. Any close relationship between the two seems improbable.

Populations from Kompong Mosena, west Flores and Komodo Island belong to a subspecies, *jaeckeli* Laidlaw, 1954 (= *floresi* Haltenorth and Jaeckel, 1940, not Bartsch, 1917). It was originally re-

ferred to the Timor *contrarius*, but it lacks the characteristic parietal notch of that species and has the banding patterns of *poecilochrous*. We prefer to place it as a subspecies of *poecilochrous*, pending examination of more material of this variable group.

XVII. GROUP OF *Amphidromus laevus* (Müller, 1774) (Timor, Alor, Banda and Tenimber Islands)

***Amphidromus (Syndromus) contrarius* (Müller, 1774)**

Range.—Timor, Rotti and Samau Islands.

Remarks.—Four geographic races have been recognized. Typical *contrarius* is known from southwest Timor, Rotti and Samau; *baaguiae* Forcart, 1936, from Baaguia, east Timor; *hanieli* Rensch, 1931, from Tjamplong, Lili, Oisau-Lili and Benu, inland west Timor; and *nikiensis* Rensch, 1931, from Niki-Niki and Ofu, south-central Timor. The names *albolabiata* Fulton, 1896, *crassa* Fulton, 1899, *subconcolor* von Martens, 1867, and *suspectus* von Martens, 1864, refer to color phases of the nominate race.

The subspecies are based on minor shape and size differences and may not be valid races. Haniel (1921) figured several long sets of shells in order to demonstrate the range of variation. *A. contrarius* is characterized by a small callous nodule on the parietal wall near the posterior angle of the aperture.

***Amphidromus (Syndromus) reflexilabris* Schepman, 1892. Figure 26.**

Range.—Southwest and west Timor.

Remarks.—The nominate subspecies is known from Amarassi in west Timor, while a subspecies, *hanielianus* Rensch, 1931, has been described from Ofu and Tai-Osapi in southwest Timor. Their distinctness seems questionable. *A. reflexilabris* is immediately recognizable by its rather large size (40–50 mm. high), large aperture and wide, strongly reflected lip. In the latter character it resembles the *inauris* form of *Amphidromus winteri*. The lip of *reflexilabris*, however, is even more markedly curled over and in some shells (CNHM 72373, paratype of *hanielianus*) forms a rolled edge to the aperture.

***Amphidromus (Syndromus) inconstans* Fulton, 1898**

Range.—Pantar, Alor (=Ombai), Pura, Roma and Wetar Islands north of Timor.

Remarks.—A relatively small (29–38 mm. high) shell with white or brown apex and with the early whorls quite variable in coloring. It differs from *contrarius* in lacking the callus nodule; from *laevus* in having brown, not orange, bands (when bands are present); and from *reflexilabris* in having a simple lip. The basic *inconstans* pattern has four spiral brown bands on the last whorl, the upper two of square chestnut-colored spots, the lower two either continuous or also interrupted into spots (CNHM 72376). Variety *gracilis* von Martens, 1899 (not Fulton, 1896), was proposed for shells with only a peripheral color band, and was extended by Pilsbry (1900, p. 210) to cover the pure yellow shells from Alor (CNHM 72375). Specimens from Roma Island were named var. *gracilis* Rolle, 1903 (not Fulton, 1896, or von Martens, 1899), and raised to subspecific rank by Zilch (1953, p. 132). This name is preoccupied by the subspecific name *gracilis* Kobelt, 1916, and the Roma Island population is here renamed subspecies *rollei* Laidlaw and Solem, 1961. The Roma shells differ in possessing a reddish color patch just above the columella; those with only the columellar color patch are color form *subsimplex* Rolle, 1903; those with a green band above the color patch are color form *viridistriata* Rolle, 1903; and those with narrow radial bands broken into spots by spiral bands of ground color are color phase *subporcellanus* Rolle, 1903 (CNHM 97360).

The population from Wetar Island was described as *Amphidromus wetaranus* Haas, 1912. The shell appears to be equivalent in color pattern to the *subporcellanus* phase of the Roma Island *rollei*, except for the dark brown apex. Only one specimen is known of *wetaranus*, however, and quite possibly the Wetar population will be shown to be equally variable when adequate materials are available.

The position of *Amphidromus oscitans* von Martens, 1899, is uncertain. It was originally thought to be only a color phase, "variety d," of *A. inconstans*, but von Martens considered it to represent a distinct species. Variety *oscitans* is known only from Alor Island. The basic color pattern consists of moderately broad, somewhat wavy radial streaks, occasionally (CNHM 72377) with a few on the spire forked; in spots the streaks show an indication of being broken up into narrow dashes by clear spiral bands. In view of the variation found by Haniel (1921) in the Timor *contrarius*, we consider it probable that intergrades between *oscitans* and *inconstans* will be found when sufficient collecting has been done.

Our tentative classification of the *inconstans* complex can be summarized as:

Amphidromus inconstans inconstans Fulton, 1898

Color phases *inconstans*, *gracilis*, *oscitans*

Amphidromus inconstans rollei Laidlaw and Solem, 1961

Color phases *subsimplex*, *viridistriata*, *subporcellanus*

Amphidromus inconstans wetaranus Haas, 1912

Amphidromus (Syndromus) laevus (Müller, 1774). Figure 27.

Range.—Races are known from Roma and Kissue (=Kisser, Kisar) Islands northeast of Timor. No definite locality is known for typical *laevus*. Probably it will be discovered on one of the small satellite islands between Timor and the Tenimber Islands. Keffing Island, Ceram, is a doubtful location.



FIG. 27. *Amphidromus laevus* (Müller); holotype of *A. hemicyclus* Rochebrune. Photographs by courtesy of Musée National d'Histoire Naturelle, Paris.

Remarks.—Apparently *A. laevus* is quite common, since most old collections will have specimens labeled Java, Timor, Moluccas, Tenimber Islands, Ambon, Ceram, or Singapore. It is readily recognizable by its yellow color with nearly always one or two spiral orange bands and often several purplish, green, or reddish spiral bands. It is never obliquely striped or flammulated. *Amphidromus hemicyclus* Rochebrune, 1882 (fig. 27) is a synonym of *A. laevus*. The unfigured *Amphidromus kobelti* Rolle, 1893, is probably a synonym of *A. laevus*.

Two island populations described as varieties may represent valid subspecies. Without discovery of the distribution of the typical form, it seems best to leave them as varieties. Material from Roma Island (CNHM 97362) is relatively large (44 mm.) with re-

duced spiral banding; it was named variety *romaensis* Rolle, 1903. Shells from Kissue Island (CNHM 72356, CNHM 97369) are small (30–32 mm. high) with the ground color white on the spire and with numerous spiral bands. No large series were seen, and the constancy of these variants is uncertain.

Unlike most species of *Syndromus*, many specimens of *laevus* show a definite indication of a resting period during shell growth. These breaks, comparable to the varix of many *Amphidromus*, sens. str., are often marked by a discontinuity in the spiral color bands.

It is remarkable that no definite locality is known for this species, since it was apparently quite commonly collected over 100 years ago. Almost certainly it will be discovered somewhere along the margin of the Banda Sea.

Amphidromus (Syndromus) columellaris von Moellendorff, 1892

Range.—Described from the Tenimber Islands and definitely recorded from Sierah Island in the same group.

Remarks.—A very slender, yellowish shell with broad green or reddish radial stripes interrupted by a medial fillet and with three spiral red bands, one subperipheral, one subsutural, and the third columellar. The umbilicus is moderately open and the columella somewhat twisted. The apex is dark brown or purple. The coloration is a modification of the pattern found in some forms of *contrarius*, but the shape and columellar twist at once separate the two species. *A. columellaris* is the easternmost member of *Amphidromus*.

Two color varieties are known. Shells without the subsutural red band are variety *gloriosa* "Boettger" Fulton, 1896; variety *sierahensis* Pilsbry, 1900, from Sierah Island (CNHM 97353) lacks the subperipheral color band and the base has two bluish-green zones separated by a yellow patch.

Amphidromus (Syndromus) sp. Figure 28.

Range.—Banda Islands.

Remarks.—We have seen a series of twelve semi-fossil shells from the Banda Islands (Leiden Museum, CNHM 72353). They have about six whorls, a moderately open umbilicus, and a thickened, reflected lip. The whorls are moderately convex. Unfortunately, no trace of color pattern remains on the shells (33–38 mm. high). The columellar insertion resembles that of *A. sinistralis* but lacks

the well-developed prolongation of the columella that is characteristic of the latter species (see fig. 30, C). Without fresh specimens it is impossible to decide whether the Banda shells represent a new species or not.

XVIII. GROUP OF *Amphidromus sinistralis* (Reeve, 1849)
(Celebes)

Amphidromus (Syndromus) sinistralis (Reeve, 1849). Figures 29, A, 30, C.

Range.—Many localities in the northern peninsula of Celebes from Paguat westward. Unpublished records include Toemaratas

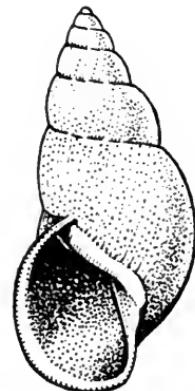


FIG. 28. *Amphidromus* sp. Banda Islands. Drawing of a shell in the Rijksmuseum van Natuurlijke Historie, Leiden, by the late Guy L. Wilkins.



A



B

FIG. 29. A, *Amphidromus sinistralis* var. *fasciatus* P. and F. Sarasin; holotype. Gorontalo, Celebes. Photograph by courtesy of Naturhistorisches Museum, Basel. B, *A. krujiti* P. and F. Sarasin; lectotype. Karoa, Celebes. Photograph by courtesy of Naturhistorisches Museum, Basel.

at 4,000 feet elevation (USNM 337046) and Likoepang (USNM 337047).

Remarks.—The open umbilicus with the columellar margin thickened above the umbilical insertion is diagnostic and easily separates the *sinistralis* series from the *adamsii* complex with simple columella and closed or barely perforate umbilicus. The color pattern of translucent grayish dots, blotches or streaks on a pale pink or yellow background is also characteristic. This same color pattern is found in radial streaks on another species, *Amphidromus maculiferus multicolor* (see p. 550). Individual color variations have been named *decolor* Tapparone-Canefri, 1884; *fasciatus* P. and F. Sarasin, 1899 (not von Martens, 1867) (fig. 29, A); *lutea* "von Martens" Fulton, 1896 (CNHM 72357 from Mapanget, Minahasi, Celebes); and *rosea* "von Martens" Fulton, 1896. They are of no systematic importance; for identifying characters see Pilsbry (1900, pp. 232-233).

Amphidromus (Syndromus) kruijti P. and F. Sarasin, 1899.
Figure 29, B.

Range.—Northern and north-central Celebes.

Remarks.—The umbilical area and columella are the same as in *A. sinistralis*, but *A. kruijti* differs by its larger size (45-55 mm. high), thicker shell with rugose surface, thickened lip and parietal callus and greater number of whorls (7½). A specimen in the Leiden Museum from Gorontalo has a pair of brownish spiral bands around the umbilicus. Some individuals show traces of wavy radial streaks on the lower whorls. Apparently *A. kruijti* is occasionally collected with *A. sinistralis*. We have seen museum specimens of both *sinistralis* (CNHM 97356) and *kruijti* (CNHM 72360) from Menado.

Amphidromus (Syndromus) beccarii Tapparone-Canefri, 1883.
Figures 30, A, B, 31.

Range.—Kandari, Pundidaha, southeast Celebes.

Remarks.—The similarity to ribbed forms of *A. palaceus* is quite remarkable, but details of the color and columellar insertion strongly suggest that *A. beccarii* is a development from the *sinistralis* stock that parallels the *palaceus-winteri* complex. The holotype and two paratypes of *A. beccarii* were lent by Dr. E. Tortonese of the Museo Civico di Storia Naturale, Genova (measurements, respectively, height 45.6, 43.0 and 44.2 mm., h/d ratios 2.09, 2.10 and 2.04, with

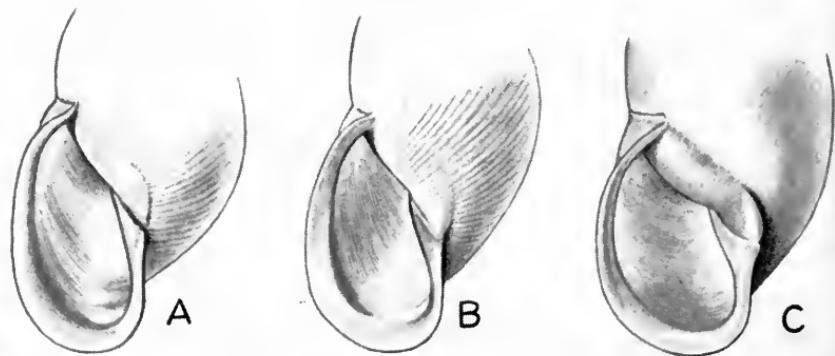


FIG. 30. Columellar prolongation in *Amphidromus sinistralis* group. A, B, *A. beccarii* Tapparone-Caneffri; paratypes. Kandari, Celebes; collected by O. Beccari in April 1874. Museo Civico de Storia Naturale, Genova. C, *A. sinistralis* (Reeve); Celebes. CNHM 41471.

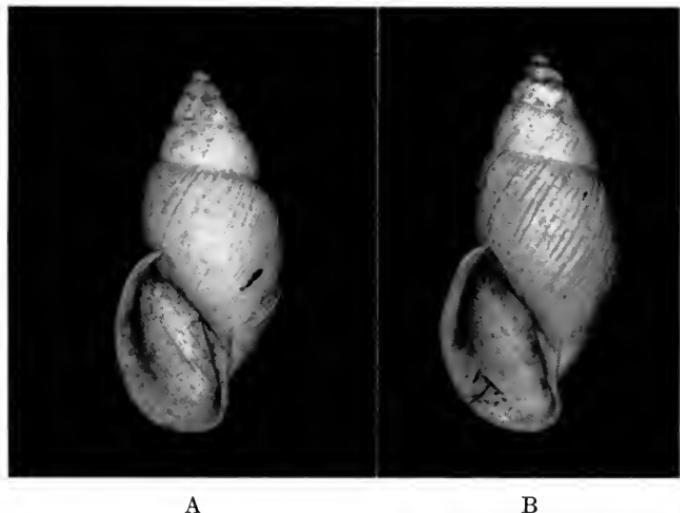


FIG. 31. *Amphidromus beccarii* Tapparone-Caneffri; A, holotype; B, paratype. Kandari, Celebes. Museo Civico di Storia Naturale, Genova.

$6\frac{1}{4}$, $6\frac{1}{4}$ and 6 whorls). The white color, oblique ribs, and general appearance as to whorl increment are the same as in the *purus* form of *A. palaceus*. The more oblique aperture, smaller size, thinner parietal callus and more strongly twisted columella of *A. beccarii* easily separate the two. The columella shows a faint trace (fig. 30, A and B) of the *sinistralis* (fig. 29, A) prolongation, and the upper

spire has a few flecks of the gray translucent blotches characteristic of *sinistralis*. *A. beccarii* obviously differs from *sinistralis* and *kruijti* by its more rapidly increasing whorls and larger aperture. Nevertheless, it is almost certainly a derivative of the *sinistralis* complex.

Amphidromus (Syndromus) centrocelebensis Bollinger, 1918.
Figure 32.

Range.—Known from three stations on the Palu River, central Celebes.

Remarks.—*A. centrocelebensis* apparently is more closely related to *A. sinistralis* than to either *A. kruijti* or *A. beccarii*. The central Celebes shell is relatively small (height 31–49 mm.), with fairly weak radial sculpture, a trace of spiral color banding and the same translucent flecks found in *sinistralis*. It differs from the other Celebes species by lacking the prolongation of the columellar margin, although the umbilicus is open as in the other three species. The lectotypes of both *kruijti* and *centrocelebensis* are here refigured (figs. 29, B, and 32).



FIG. 32. *Amphidromus centrocelebensis* Bollinger; lectotype. Sakedi, Palu Valley, central Celebes. Photograph by courtesy of Naturhistorisches Museum, Basel.

Amphidromus (Syndromus) kuehni von Moellendorff, 1902

Range.—Tomea and Kaledupa, Tukangbesi Islands, off southeastern Celebes.

Remarks.—The columellar prolongation is the same as in *sinistralis*, but the color pattern and direction of coiling are distinctive. *A. kuehni* is the *only* normally dextral *Syndromus*, and it differs from the other members of the *sinistralis* series in having the flecks arranged in a series of spiral bands. There are two solid subperiph-

eral spiral color bands, the apex is dark, and the early whorls show faint radial broad stripes. The original locality was Kaledupa; the Tomea record is based on one specimen (CNHM 97358).

Amphidromus (Syndromus) maculatus Fulton, 1896. Figure 33.

Range.—South Celebes and Kalao Island.



FIG. 33. *Amphidromus maculatus bungiensis* Pilsbry; lectotype of *A. contrarius* var. *subconcolor* P. and F. Sarasin, 1899 (not von Martens, 1867). Bungi, Gulf of Mandar, southwest Celebes. Photograph by courtesy of Naturhistorisches Museum, Basel.

Remarks.—The normal color pattern of two spiral bands of equidistant brown spots above the periphery of the body whorl and two or three solid or spotted bands below the periphery is distinctive. Typical *maculatus* clearly shows the *sinistralis* type of columellar prolongation, as does the color variety *jucundus* "Fulton" von Moellendorff, 1896, which has oblique stripes on the body whorl, much as in some of the striped phases of *sinistralis*. Both *maculatus* and *jucundus* have been collected at Macassar and Bua Kraeng. They seem to represent alternative color phases, although von Moellendorff and Pilsbry kept them as distinct species.

Shells from Kalao Island (CNHM 72372, CNHM 97366, USNM 220050) lack the columellar prolongation and have the spiral bands on the upper whorl reduced from very broad to very narrow. We are uncertain as to whether they should be considered a subspecies or a species, but are tentatively giving them subspecific rank under the name *kalaoensis* Fulton, 1896. Our decision is influenced by the apparent loss of the columellar prolongation in the mainland form, *bungiensis* Pilsbry, 1900 (fig. 33), from Bungi, Gulf of Mandar. This subspecies has the spiral banding absent.

Amphidromus (Syndromus) annae von Martens, 1891

Range.—Saleyer Island, South Celebes.

Remarks.—The color pattern is quite variable, ranging from a series of spiral dots to a nearly plain shell with only one or two sets of dots near the apex. The parietal callus, however, is always reddish. Many specimens have a partial columellar elongation, although some (CNHM 72367) have a simple columella. *A. annae* may well prove to be only a subspecies of *A. maculatus*, but the red parietal callus and less flattened whorls lead us to consider it specifically distinct.

XIX. GROUP OF *Amphidromus adamsii* (Reeve, 1848) (Borneo and the Philippines)**Amphidromus (Syndromus) adamsii** (Reeve, 1848)

Range.—Borneo, Labuan, Banguey, Balambangan and Low Islands.

Remarks.—A rather small (32 mm. high) shell with closed umbilicus and a brightly colored shell. Without unsorted field collections it is impossible to establish a satisfactory classification of this complex. The seven named forms from Banguey Island are fairly obviously color variations, but the status of other named forms is uncertain. Some may represent valid species or subspecies.

The type locality of *adamsii* is a small islet between Banguey and Balambangan Islands. The other eighteen names we consider to be related to this complex are grouped below geographically:

Sarawak: *angulatus* Fulton, 1896, and *hosei* Smith, 1895

North Borneo: *aureocinctus* Fulton, 1896, *inornatus* Fulton, 1896, and *rubiginosus* Fulton, 1896

East Borneo: *obliquatus* von Martens, 1903, and *placidus* Fulton, 1896

Northwest Borneo: *weyersi* Dautzenberg, 1901

“Borneo”: *rufocinctus* Fulton, 1896

Banguey Island: *articulatus* Fulton, 1896, *duplocinctus* Fulton, 1896, *luteofasciatus* Fulton, 1896, *ornatus* Fulton, 1896, *simplex* Fulton, 1896, *subunicolor* Fulton, 1896, and *superbus* Fulton, 1896

Labuan Island: *hamatus* Fulton, 1896

Mangsi Island: *mangsonianus* Pilsbry, 1900

Of the above names, *articulatus*, *luteofasciatus*, *mangsonianus*, *ornatus*, *rufocinctus*, *simplex*, *subunicolor*, *superbus* and *inornatus* have

been used as varietal names only. Pilsbry (1900) used the varietal names *aureocinctus* and *rubiginosus* for subspecies; reduced Fulton's species *angulatus* and *hamatus* to subspecific rank; and considered Fulton's species *placidus* to be a color phase of the subspecies *hamatus*. The names *obliquatus* and *weyersi* were proposed as subspecies. Generally *hosei* has been considered a distinct species.

We tentatively consider *angulatus*, *hamatus*, *hosei*, *obliquatus* and *weyersi* as subspecies. The remaining names probably refer to color phases of *Amphidromus a. adamsii*. We saw only sets with one or two shells in each. Thus no study of variation or revision of this species could be attempted.

Amphidromus (Syndromus) pictus Fulton, 1896. Figures 34, 35.

Range.—Apparently widely distributed in the interior of Borneo. Reported from Mount Kinabalu, Singkawang, Mandhor, Mount Tiloeng, Mount Dadap and Mount Sekedau on the Ketoengan River.



FIG. 34. *Amphidromus pictus* var. *concinnus* Fulton. North Borneo. CNHM 72369 ex Fulton.



FIG. 35. *Amphidromus pictus* var. *gossi* Bartsch. North Borneo. CNHM 72386 ex Fulton.

Remarks.—This is a much darker-colored shell than that of *A. adamsii*, having a basic pattern of broad, oblique bluish-gray or greenish-gray stripes on the lower whorls. The shape and details of the color pattern vary widely. In the nominate form there is a red columella and two spiral purplish-gray bands below the periphery of the body whorl. Color form *concinnus* Fulton, 1896, has a continuous greenish-gray zone with vague narrow streaks on the

upper half of the lower whorls. The lower half of the whorls are striped as in typical *pictus*, but occasionally the basal spiral bands are absent. An unnamed variety from Singkawang on the west coast of Borneo has only a few broad, confluent stripes.

Amphidromus gossi Bartsch, 1904, is a slightly more obese form with narrow yellow stripes and no spiral basal bands. It was described from "13,000 feet" on Mount Kinabalu. This altitude seems highly improbable, since the summit is only 13,455 feet and the mountain is bare of vegetation for a considerable distance below the top. *A. gossi* (fig. 35) has a quite different shape from *A. pictus* (fig. 34), but material discussed below provides intergrades and leads us to consider them synonymous.

J. A. Griswold collected *A. pictus* in 1937 on Mount Kinabalu at Bundatuan, Luidan River (elevation 3,340 feet; MCZ 112237), Tenompok (4,900 feet; MCZ 112238) and Paka Cave (9,780 feet; MCZ 112236). The single specimen from Paka Cave had the *concinus* color pattern and was 32.7 mm. high.

Thirteen adults from Tenompok measured: height 31.1-40.2 mm. (mean 35.1 mm.), diameter 16.2-19.1 mm. (mean 17.3), h/d ratio 1.90-2.22 (mean 2.03), with 6 to 6 3/4 whorls (mean 6 3/8). Most examples were of the *concinus* pattern, but a few were typical *pictus* with very narrow yellow stripes. One shell lacked the radial stripes on the last whorl, which was pale blue-green.

Seven adults from Bundatuan measured: height 34.3-39.4 mm. (mean 35.9), diameter 16.4-18.3 mm. (mean 17.6), h/d ratio 1.96-2.12 (mean 2.04), with 6 1/8 to 6 3/4 whorls (mean 6 3/8). A few young shells were typical *gossi* pattern, others *concinus*, and several were difficult to classify. Some intergradation was seen between the color patterns and shapes, so that we have no hesitation in considering that *pictus*, *concinus* and *gossi* represent different color phases of one species.

Amphidromus pictus differs from *A. adamsii* by its larger size and more elongate shape, color pattern of oblique grayish-green or bluish stripes on a yellow ground color and generally darker appearance. Most specimens of *pictus* have a slight umbilical chink, while specimens of *adamsii* tend to vary from a closed umbilicus to a relatively open one. Possibly adequate collections will show that *pictus* and *adamsii* are altitudinal variations of the same species, but current evidence suggests that they are distinct species.

The relationship between *pictus* and *quadrasi* seems even closer. The shape and coloration of the early whorls are identical, the pri-

mary difference lying in the coloration of the lower whorls and the almost always closed umbilicus of *A. quadrasi*. The Palawan *aborlanensis* and Balabac *dubius* variations of *A. quadrasi* closely match the color pattern of *A. p. pictus*, differing in the width of the yellow stripes and in having a white, not reddish-purple lip. It is uncertain whether this similarity is convergent evolution in montane populations or whether it reflects phylogeny.

Without better material from known altitudinal zones in both Borneo and the Philippines, it seems best to maintain *quadrasi* and *pictus* as separate species. Unquestionably they are very closely related, but the small umbilical difference and the ordinarily very distinct color patterns lead us to keep them separated.

Amphidromus (Syndromus) quadrasi Hidalgo, 1887. Figure 36.

Range.—Balabac, Palawan and their satellite islands, with single recorded localities in the Calamianes Group and on Negros Island.

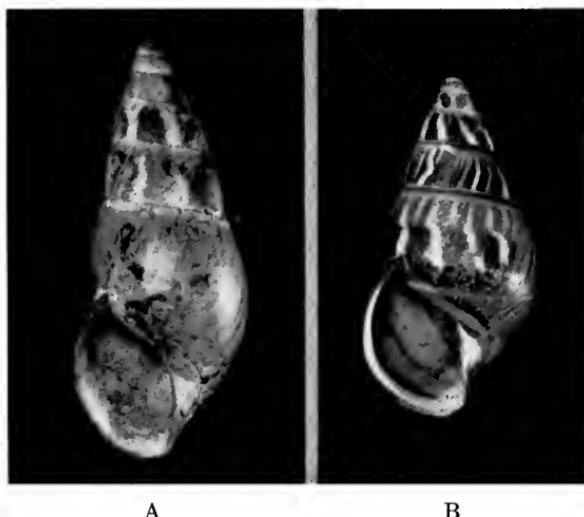


FIG. 36. *Amphidromus quadrasi everetti* Fulton. Tigoplan River, Brooke's Point, Palawan, Philippine Islands. A, CNHM 54946; from 750 feet elevation. B, CNHM 54947, from 180 feet elevation.

Remarks.—Bartsch (1917, 1918, 1919) proposed a bewildering number of subspecific names for this species. The great majority of these are obviously untenable, but it is difficult to produce a satisfactory alternative classification. Color pattern runs riot in many populations; Bartsch recognized 28 different color phases in

one, although some samples exhibit uniform patterning. Most museum material has long since been divided into color forms, but, despite this, intergradation between color patterns is easily demonstrated.

We have chosen to recognize tentatively only three subspecies and some distinctive color forms within the subspecies. The color forms are merely extremes of variation or, in a few cases, are characteristic of one or two local populations. Insufficient localized material from Palawan is available to be certain that some of the forms cited below are not actually geographic races. Bartsch (1918) recognized two species, *quadrasi* and *versicolor*, based on whether the apex was white or brown. Material from Vancalan Island (CNHM 11718, topotypes of form *higginsi*) contains specimens with both white and brown apices. Apical coloration varies just as any other character and cannot be used to divide populations of *quadrasi* into either species or subspecies.

Our tentative reclassification of *Amphidromus quadrasi* is:

Amphidromus quadrasi quadrasi Hidalgo, 1887

Range.—Balabac and the satellite islands Candaraman, Caxisigan, Bekin, Bugsuc, Bancalan (= Vancalan), Mantangule, Ramos, Secam and Canabungan. Bacalod, Negros Island, is a questionable locality.

Remarks.—Three primary color variants can be recognized: *quadrasi* (sens. str.), *versicolor* and *dubius*. Typical *quadrasi* has a white apex and a red subsutural band and the lower whorls become progressively more intensely yellow with more or less prominent green stripes near the aperture. First described from Candaraman Island, it is common in museum collections labeled "Balabac" (CNHM 19206, 72381, 97334, 97339; MCZ 94852). Quite possibly these shells were purchased from natives on Balabac, but they may have been collected on one of the outlying islands. Slightly smaller shells with the same color pattern were named *caxisiganensis* Bartsch, 1918 (Caxisigan Island), and *ledyardi* Bartsch, 1918 (Bekin Island). They are unquestionably synonymous with typical *quadrasi*, the size differences being statistically insignificant. The shells, supposedly from Bacalod, Negros Island, that were named *negrosensis* Bartsch, 1946, appear to be less faded individuals of color form *quadrasi*. It is unknown whether the single known set represents a valid natural occurrence, an introduced population, or a mislabeled set of shells.

Variety *versicolor* Fulton, 1896, generally has a dark apex, and the color pattern varies widely. Some shells are plain white or yellow, often with a greenish flame behind the aperture; others have well-developed forked brownish radial markings with or without the greenish lines of typical *quadrasi* behind the aperture. Every degree of intergradation can be seen in large sets, ranging from shells inseparable in coloring from typical *quadrasi* to dark shells that are unquestionably *dubius* (see below). The only use for the name *versicolor* is to designate the highly variable populations on several of the small islands. Bartsch (1917) restricted *versicolor* to the shells ornamented only with the greenish flame and incorrectly used the name *solida* Fulton, 1896, for the shells with brownish markings on the upper whorls. Bartsch (1918) provided subspecific names for populations from the different islands of the Palawan Passage. There are no criteria by which the several populations can be distinguished, although the overall impression of color variation is slightly different in each case. The range of color variation is the same as that found in the Balabac *versicolor*. We thus consider that the names *higginsi* Bartsch, 1918 (Vanealan Island, CNHM 11718), *weberi* Bartsch, 1918 (Mantangule Island, CNHM 11719), *secamensis* Bartsch, 1919 (Secam Island; CNHM 41492, 62803, 72380, and 75802) and *canabunganensis* Bartsch, 1919, are synonyms of color form *versicolor*.

Variety *dubius* Fulton, 1896, from Balabac (CNHM 97340 and 97345) has the apex dark, the early whorls white and the later whorls with dark flammulations that become obsolete on the body whorl. The base of the shell is yellow (occasionally with brown spiral bands), the umbilical region red, the lip and aperture white or purple. Quite possibly the observed museum material represents selected dark shells of the *versicolor* pattern and no pure populations may exist.

We consider that the names *quadrasi* and *dubius* represent the extreme color variations of a continuous series and that *versicolor* is a convenient term for the vastly more numerous intermediate examples. In unsorted sets from the smaller islands, all three variations are present and no effective division into three categories can be made.

Amphidromus quadrasi everetti Fulton, 1896. Figure 36.

Range.—Palawan and (?)Coron, Calamianes Group.

Remarks.—Color variation within *everetti* is not as simple to describe as that found in typical *quadrasi*. Quite possibly the variations may have a geographic basis, but available data are insufficient to enable a decision. We thus have chosen to consider the variations as color phases, except for *aborlanensis*, which we have kept as a subspecies.

Typical *everetti* is similar to the Balabac form *dubius* but differs in having the radial markings much more fragmented on the upper portion of each whorl and in having a much darker body color. The type locality of *everetti* is "Palawan" and the figures and probable paratypes (CNHM 72382; MCZ 184640) have rounded peripheries on the body whorl. Most localized Palawan material is from the vicinity of Brooke's Point (CNHM 54946, 54947, 54949; MCZ 138065, 138067; many lots in USNM). All of these shells have a distinct peripheral angulation. Additional variation may be correlated with altitude, since a shell (fig. 36, A) from 750 feet elevation (CNHM 54946) along the Tigoplan River is much more elongated and slender than a shell from 180 feet elevation (fig. 36, B) along the same stream. Whether the angulated and non-angulated shells are subspecifically separable cannot be decided until the latter are known from an exact locality.

In many specimens of *everetti* the color flames become obsolete on the last whorl or lower portions of the spire. *Amphidromus everetti* var. *connectans* Fulton, 1896, was described with the type locality "North Borneo." Examination of the type in the British Museum (Natural History) suggested that *connectans* was based on a mislabeled Palawan shell in which the banding obsolescence had occurred quite high on the spire. The shells from Coron, Calamianes Group, that were called *demesai* Bartsch, 1946, appear to be intermediate in color pattern between *everetti* and *connectans*. *Amphidromus quadrasi palawanensis* Bartsch, 1917, from the "Palawan Passage" also seems to be only a minor variation of the *everetti* pattern.

The names *everetti*, *connectans*, *demesai*, and *palawanensis* seem to refer to essentially the same color form, and we believe them to be synonymous. The Coron record needs confirmation, since none of the early collectors found this form and the type lot, although collected before 1940, did not reach the United States until 1945. During the Japanese occupation of the Philippine Islands it is quite possible that the labels on the specimens were inadvertently mixed.

Amphidromus versicolor monticolus Bartsch, 1918, is known from two shells collected at 2,400 feet elevation on Mount Landargung, Palawan. They are lighter in color than most *everetti*, with a yellowish body whorl and faint green lines. They come the closest of any Palawan shells examined to forming an intergrade to the lighter *dubius* variations. Probably *monticolus* represents only a slight color variation.

Material of variety *solida* Fulton, 1896, was seen from Soutti, Palawan (CM uncatalogued), and southern Palawan (CNHM 41479). The shells have the radial markings greatly reduced and restricted to the upper whorls, a broad white spiral band just below the suture, and the last whorl white, yellow or reddish-brown. If further collections show that *solida* has a definite geographic range, then subspecific separation would be advisable. Without more material, we prefer to leave it as a well-marked color form of *everetti*.

***Amphidromus quadrasi aborlanensis* Bartsch, 1946**

Range.—Mount Aborlan, Palawan.

Remarks.—The types in the U. S. National Museum and type lot material (MCZ 138066) were the only specimens seen. The olive-green radial markings are generally unforked above and the stripes of yellow ground color are much wider and more regularly spaced than in the lowland *everetti*. Coloration of the apex is the same as in *everetti*, but *aborlanensis* lacks any trace of a subsutural red band.

Known specimens are readily separable from *everetti* and bear a striking resemblance to the Bornean *pictus* (see p. 582). We have tentatively considered that *aborlanensis* is a valid montane subspecies.

Adequate collections from different sections of Palawan and Balabac are needed to decide whether the above tripartite division of *quadrasi* is correct or oversimplified. Only when such collections are available and more material of the Bornean *pictus* has been assembled, will it be possible to determine the true affinities of *quadrasi*, *adamsii* and *pictus*.

***Amphidromus (Syndromus) coeruleus* Clench and Archer, 1932.**

Figure 16, B.

Range.—Known from the type collection on the Baram River, Sarawak.

Remarks.—The closed umbilicus and coloration of the early whorls show that *A. coeruleus* is a modification of the *adamsii* complex, but it is quite distinctive in the shape and color pattern of the lower whorls. *A. coeruleus* is relatively large (38–44 mm. high) for a *Syndromus* and has a somewhat twisted columella with a reddish patch. The upper whorls have the normal, oblique, occasionally forked, radial, brownish-red streaks of *A. quadrasii* and *A. pictus*, but in the lower whorls the yellow ground color is progressively encroached on by ill-defined radial bars of light gray that widen and coalesce to form a gray-blue ground color with a very few wavy yellow streaks. These streaks may be broken up into elongated yellow flecks that usually have a small spot of intense blue color at their posterior edge. In the picturesque term of their describers, these flecks look like "little flights of meteors." Once seen, this color pattern is unforgettable and distinguishes *coeruleus* from all other known *Amphidromus*. The red and white spotted pattern of *Amphidromus m. maculiferus* (see p. 549) is similar in design—a light spot followed by intense color—but is rather different in structure and appearance.

A. coeruleus is relatively obese and has a moderately swollen body whorl. Apparently it is known from one collection made many years ago; a probable type lot shell (CNHM 72371) is figured (fig. 16, B).

GONIODROMUS (Group XX)

XX. GROUP OF *Amphidromus bülowi* Fruhstorfer, 1905

Relatively large (48–60 mm. high), solid, brownish shells with dull, often partially eroded, surface. Columellar and basal lip angulated at junction with a ridge or channel behind.

Amphidromus (Goniodromus) bülowi Fruhstorfer, 1905. Figure 37.

Range.—Padang Sikeh, Singalang, Sumatra, at 4,000–5,000 feet elevation, is the only definite locality.

Remarks.—A paratype from Bülow labeled "West Sumatra" (CNHM 72436) is figured. The Sumatran records have been doubted, but no evidence to confirm or disprove the two citations is available. The figures of the holotype show a shell very similar to *A. asper*, while the figured paratype (fig. 37) is almost identical to *A. mirandus*. Possibly only one species is involved.

Amphidromus (Goniodromus) mirandus Bavay and Dautzenberg, 1912

Range.—Lang-Bian, Annam.

Remarks.—Except for the greenish color, this species shows little or no difference from the paratype of *A. bülowi*. *A. mirandus* was collected by Messager, together with specimens that we presume to be *A. asper*.

Amphidromus (Goniodromus) asper Haas, 1934

Range.—Known from Fruhstorfer's collecting in 1900 at 2,000–3,000 feet elevation on the way from the coast to the Lang-Bian Plateau, Annam.

Remarks.—*A. asper* and *A. mirandus* differ in the same way as the holotype and paratype of *A. bülowi*. All three "species" are known only from the handful of specimens cited in the original descriptions and discussions. We have indicated in the alphabetical list of names that *mirandus* and *asper* almost certainly have been collected together. We strongly suspect that they are synonymous, but we lack the material needed to investigate this idea. Possibly *Goniodromus* is based on diseased shells.

INCERTAE SEDIS

The following names have been carried in the literature for from 58 to 121 years without the addition of any new data to the original descriptions. Some of the types are available, but the relationships, distribution and validity remain uncertain. Rather than continue guessing as to their position, we have lumped them together here. Two names whose types have been identified during this study could have been used to replace relatively well-known but junior names. We prefer to maintain nomenclatural stability and have refused to replace well-known names with previously unrecognizable appellations that were associated with totally erroneous locality data.

The several names are listed and discussed in the chronological order of their date of description.

Partula bataviae Grateloup, 1840

Listed as coming from "Java." The description has been variously compared with Javanese species, the Celebesian *A. sinistralis*

and the Bornean *A. adamsii* var. *rubiginosus*. No Javanese shell is at all similar to the original description and figure. Grateloup's figured specimen and presumed lectotype has been recently rediscovered in the British Museum (Natural History). The shell seems to be a worn example of *A. adamsii* var. *rubiginosus*, but we prefer not to replace the well-known *adamsii* with the unused name *bata-viae*.



FIG. 37. *Amphidromus bülowi* Fruhstorfer; paratype. West Sumatra. CNHM 72436.



FIG. 38. *Amphidromus mundus* (Pfeiffer). Philippines (probably an error). AMNH 40871.

Bulimus mundus Pfeiffer, 1853. Figure 38.

Populations of this form have been variously reported from "Singapore" and the "Philippines," but we still have no knowledge of where they exist. The location of the holotype is unknown, but shells labeled "mundus" are present in various old collections.

Specimens from Singapore (AMNH 53016) and the Philippines (AMNH 40871) ranged in height from 31.5 to 37.1 mm. (mean 34.1), diameter from 19.2 to 21.7 (mean 20.4), h/d ratio from 1.56 to 1.79 (mean 1.67), with $5\frac{3}{4}$ to 6 whorls (mean $5\frac{7}{8}$). The shells (fig. 38)

are small, white and somewhat globose. They may be dwarf albino *Amphidromus perversus* or possibly *A. chloris*. Until an exact locality is known, we prefer not to use this name in association with any species.

Bulimus cochinchinensis Pfeiffer, 1856. Figure 39.

Described from "Cochinchina" and never reported from any more precise locality. The shape of *cochinchinensis* is more cylindric than that of any known species. A probable type lot specimen (AMNH 53907) was the only shell seen by the junior author. It is white with a faint yellow tinge (height 46.0 mm., diameter 22.4 mm., h/d ratio 2.05, with $7\frac{3}{8}$ whorls). The height-aperture ratio is 2.35. The aperture, umbilicus and sculpture suggest that *A. cochinchinensis* may be an elongated relative of *Amphidromus metabolus*. The latter species has a proportionately shorter spire, but in general appearance is similar to *cochinchinensis*. Until Pfeiffer's species has been rediscovered and an exact locality is available, we prefer not to include *cochinchinensis* among the recognized species of *Amphidromus*.

Bulimus lindstedti Pfeiffer, 1857

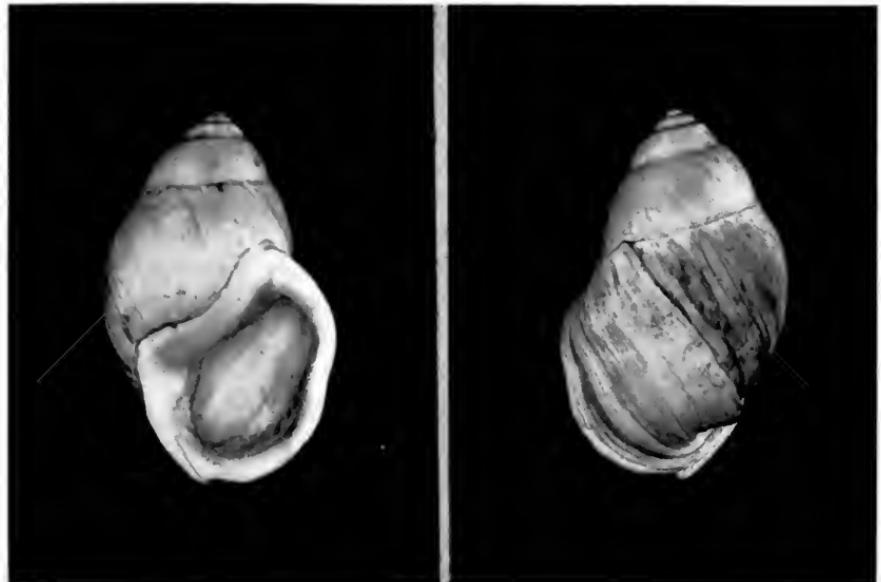
The original locality of "Malacca" is evidently erroneous. Fulton (1896, p. 85, pl. 5, figs. 15, 15a) equated *lindstedti* with the Balabac, Philippine Islands, *quadrasi* series. Bartsch (1917) did not use *lindstedti* for any Philippine form and it has not been mentioned in the literature since Pilsbry (1900). The lectotype of *lindstedti* in the British Museum (Natural History) appears to be a somewhat worn example of the *versicolor* form of *Amphidromus quadrasi*. Identification cannot be absolutely certain because of the worn condition. The name *lindstedti* Pfeiffer, 1857, has clear priority over the name *quadrasi* Hidalgo, 1887. We prefer not to replace the well-known *quadrasi* by an earlier, dubious synonym. We thus choose to consider that *Bulimus lindstedti* Pfeiffer, 1857, is a *nomen dubium* that cannot be referred with assurance to any species.

Amphidromus costifer Smith, 1893. Figure 40.

Seven specimens collected in 1890 by Eudel "dans les Montagnes boîtées du Huyen de Tri-phuoc, Province Binh-dinh, An-nam" were the cotypes of *Amphidromus costifer*. One cotype (AMNH 53327), height 44.5 mm., diameter 29.3 mm., h/d ratio 1.52, with $5\frac{1}{2}$ whorls, was examined by the junior author. The first $4\frac{1}{2}$ whorls appear



FIG. 39. *Amphidromus cochinchinensis* (Pfeiffer). No locality with shell; probably from type lot. AMNH 53907.



A

B

FIG. 40. *Amphidromus costifer* Smith; almost certainly a paratype. Annam. AMNH 53327. A, front view; B, back view, showing abnormal growth and early lip.

to show normal growth. The shell, up to this point, is white, with moderately developed low growth wrinkles. This is followed by brownish, obviously abnormal growth to the formation of a lip at $5\frac{1}{4}$ whorls. This is marked inside by a slight depression. Growth resumed and a second lip was formed at $5\frac{1}{2}$ whorls. The surface below $4\frac{1}{2}$ whorls is totally different in texture from the early whorls.

The same kind of growth has been seen in some North American land shells that were transported by floods from a favorable habitat to a marginal area. Growth subsequent to arrival in the new area was very similar in some *Allogona profunda* (Say) observed by the junior author.

We suspect that *Amphidromus costifer* is based on such abnormally grown individuals of some other species. The range in size of *costifer* (44.5-57 mm.) suggests that possibly *Amphidromus (Goniadromus) mirandus* Bavay and Dautzenberg, 1912, might be the species from which the teratological individuals named *costifer* were derived. We examined no material of *mirandus* during this study, but the type figures show a shell of the right size and with large enough apical whorls.

Amphidromus waterstraati Rolle, 1903

The location of the single large (78 mm.) shell from Palawan, Philippine Islands, is unknown. The Palawan *Amphidromus entobaptus* is much smaller, and only some forms of *A. maculiferus multicolor* approach the size of Rolle's species. Unless the single known shell of this unfigured species is discovered, its identity will remain unknown. Certainly no known Philippine shell resembles *A. atricallosus leucoxanthus*, the only form compared to *A. waterstraati* in the original description.

Amphidromus cognatus Fulton, 1907

This species was described from a single shell without any locality data. The type has been recently discovered in the British Museum (Natural History). Possibly *A. cognatus* is a form of *A. sinistralis*, but we are not certain enough of its affinities to place it in the synonymy of the latter species.

GEOGRAPHICAL DISTRIBUTION

Amphidromus ranges through most of the Oriental Region, Wallacea Transition Zone, and part of the Philippine Fringing

Archipelago of Darlington (1957). In peninsular India and Ceylon it is replaced by *Beddomea*. It is absent from much of the northern portion of the Oriental Region, including Hainan and Formosa, the northern Philippine Islands and Wallacea east of Weber's Line (except for Tenimber and Banda Islands) plus the Talaud and Sula Islands. In discussing the distribution of *Amphidromus*, it seems most logical to divide the region into four major areas: the Indo-chinese or Continental subregion of Wallace; Malaysia or Sunda-land, including from the Isthmus of Kra to Borneo and Java; Wallacea or the area between Weber's and Wallace's lines; and the Philippine Archipelago.

Continental Southeast Asia

The hills of Assam represent the northwest limit of *Amphidromus* distribution, with the problematic Groups I through VI extending through Burma and Upper Malaya into the valley of the Mekong River and the hills bounding it. The northernmost limits of Vietnam and possibly the southern borders of China have at least a few varieties. The smallest known species come from Assam, and nearly all of the forms are difficult to relate to species from other regions. Little material has been collected in this region since 1910, and our information is based primarily upon re-evaluation of old records. Besides the problematic species, the entire area has representatives of the *atricallosus* complex (Group VII), which is the mainland equivalent of the *perversus* series; the *inversus* polytypic species ranges through southern portions, and a small group of *Syndromus* is present. The *Goniodromus* species are known from Annam and Sumatra. Since nearly all species are reported from only one or two localities, it is impossible to draw any conclusions concerning distribution patterns within the area.

Malaysia

One *Goniodromus* on Sumatra, and the *perversus* and *inversus* series related to or extending from the continental region, represent continuing influences. *A. perversus* and its varieties are distributed over nearly the entire area, except for the west Sumatran chain of islands, while *A. inversus* is nearly as widely distributed, although not found in Java or the west Sumatran islands. Java has local representatives of the *inversus* series (*A. javanicus* and *A. heerianus*), while Java, Sumatra, and the west Sumatran Islands share a series

of relatively thin-shelled, colorful species (*A. palaceus* complex, Group XI). Borneo has a separate complex (*A. martensi*, Group X).

Syndromus is widely distributed, the Sumatran and Bornean species being variable in coloration, while the Javanese species seem to be fairly constant in pattern. The Andaman and Nicobar Islands have a *Syndromus* which we are considering to be a subspecies of the Javanese *A. furcillatus*. No *Syndromus* is known from the lower portion of the Malay Peninsula.

Numerous *Amphidromus* and *Syndromus* local populations have differentiated on the West Sumatran Islands and the Natuna, Anamba, Kangean and Riu archipelagoes. Information concerning relationships between species is insufficient to allow any detailed analysis at this time.

Wallacea

Two centers of distribution are found in this region: the chain of islands from Lombok to the Tenimber group, and Celebes and its satellite island chains.

Amphidromus, sens. str., is restricted to Lombok in the first area, although both *A. perversus* and *A. inversus* are found on Celebes. Sumbawa, Sumba, Flores and possibly Bali have a related series of *Syndromus* (Group XVI) that may be derived from the Javanese *A. filozonatus*. To the east of Flores, *Syndromus* species are found on the Alor Group, Wetar, Timor, the Tenimber Islands and the Banda Group. No authenticated records from Buru and Ceram exist, although the Leiden Museum has a single unidentifiable shell labeled "Ceram" and many shells in older collections were obtained in trade on Ambon and Ceram.

Celebes has several color forms of *A. perversus*, a new subspecies of *A. inversus*, and a number of *Syndromus* grouped around *A. sinistralis*. They all show traces of a peculiar columellar insertion (see p. 576) that is not duplicated in any other species group.

Philippine Islands

The range of *Amphidromus* in the Philippines is still uncertain. Records based on a single shell with only an island name as a locality are highly suspect, and some material collected before World War II but not shipped to the United States until 1945, may have been mislabeled.

A *Syndromus*, possibly only subspecifically distinct from the Bornean *A. pictus*, is common on the Balabac-Palawan region with

single recorded localities from Negros and the Calamianes Group. The latter two records need confirmation. *A. chloris*, a probable derivative of *A. perversus*, is common on the Sulu Archipelago, Basilan, and peninsular Zamboanga on Mindanao. Its larger relative, *A. maculiferus*, lives on Basilan and Mindanao, southern Leyte, and Bohol and there are single unlocalized records from Samar and Cebu. *A. entobaptus*, a species probably related to *A. martensi* from Borneo, is common on Palawan and the Calamianes Group, with one unlocalized record from Mindoro.

Eliminating the questionable records, *Amphidromus* is known from the Sulu Archipelago, Mindanao, Bohol, Camotes, southern Leyte, the Calamianes Group, Palawan and the small islands of the Palawan Passage, including Balabac. Most islands of the Philippines are without any *Amphidromus*. The Philippine species appear to be fairly recent introductions, the variation pattern of *A. maculiferus* and the blurred distinction between *A. chloris* and *A. maculiferus* all suggesting recent evolution.

Summary

Several factors prevent a detailed analysis of distribution patterns: (1) the absence of a fossil record; (2) the lack of knowledge of anatomical variations, and the consequent inability to utilize anatomical features in classification; (3) the extremely limited data available on southeast Asian species; and (4) the unequal knowledge of most Indonesian species compared with the Philippine shells. As a result, we have chosen to limit the distributional discussion to a bare outline of facts. Too few data are available to allow profitable speculation on the origin and spread of the genus.

Amphidromus, base stock, is limited to southeast Asia and seems to be the base from which *Amphidromus*, sens. str., *Syndromus* and *Goniodromus* have been differentiated. *Amphidromus*, sens. str., extends from Burma, Thailand and former Indo-China through Indonesia to Lombok, Kangean, Borneo, Celebes and the southern Philippines. *Syndromus* ranges from southern Burma, Thailand, and Cambodia through Indonesia to the Tenimber Islands, Celebes and its satellites, Borneo and the Palawan-Balabac chain in the Philippines. *Goniodromus*, which may be based on teratological individuals of the *Amphidromus cambojiensis* complex, is known from Annam and Sumatra.

This pattern does suggest a migration from southern Asia into Indonesia, with the smaller *Syndromus* being more successful in

reaching the outlying islands to the east, and *Amphidromus*, sens. str., being more successful in invading the Philippines. Too little material is known of *Goniodromus* to enable speculation on the import of the recorded Sumatra-Annam range.

Further zoogeographic study must wait until many of the systematic and ecological problems outlined in the species accounts have been solved.

ALPHABETICAL LIST OF NAMES APPLIED TO AMPHIDROMUS

The following 309 names include every varietal, subspecific, or specific name applied to members of the genus *Amphidromus* that we have been able to locate. In every case we have cited the original description and type locality, followed by reference to the first published illustration if the form was originally unfigured. Similar data are included for *synonyms*, but not for either *subspecies* or recognizable *color forms*, if the listed name is a species. References to Fulton (1896) and Pilsbry (1900) are always given, together with complete citations of literature that has been published since 1900, including such papers issued in 1959 and 1960 as came to our attention.

Few references are included to pre-1900 literature that are not concerned with the description of new forms, or do not date from von Martens (1867). The early literature was adequately summarized by Pilsbry (1900), and changing concepts of speciation have made most references in early locality lists obsolete. Many of these pre-1900 citations could be correctly evaluated only by re-examination of the original specimens. Thus, to avoid confusion, we have decided to eliminate most of these dubious records. References to many will be found in Pilsbry (1900).

Following the literature citations, we give (1) the location of the holotype or lectotype, if known; (2) the distribution of that particular form, unless it is a synonym of a well-known species; and (3) the classification that we believe to be correct for this name. We are deeply indebted to Mr. S. P. Dance for selecting the cited lectotypes in the British Museum (Natural History) and to Dr. L. Forcart for selecting lectotypes in the Basel collection.

For each name, then, we have included basic literature references to it and to its *objective synonyms*, information on its type specimen, distribution and classification. In the section on species accounts,

we summarized range and variations; here we present nomenclatural details and a guide to the literature. The two sections are thus supplementary.

For convenience in locating the discussion of a particular species, we have included an alphabetical index to the species accounts at the end of the paper. If, for example, a name in the following list is stated to be a variety of *Amphidromus dautzenbergi*, the index list under *dautzenbergi* will give the page on which the species account of *A. dautzenbergi* can be found.

aborlanensis Bartsch, 1946

Amphidromus versicolor aborlanensis Bartsch, 1946, *Nautilus*, **60**, (2), pp. 64–65, pl. 6, fig. 1—Mount Aborlan, east central Palawan, Philippine Islands.

Holotype.—United States National Museum No. 543218.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus quadrasi aborlanensis*.

adamsii Reeve, 1848

Bulimus adamsii Reeve, 1848, *Conch. Icon.*, *Bulimus*, pl. 13, fig. 73 a–d (lectotype *a* and *b*)—islet between Banguey and Balambangan Islands, Borneo; Adams and Reeve, 1849, *Voy. Samarang*, *Moll.*, pp. 58–59, pl. 15, fig. 1 *a, b*; Pfeiffer, 1849, *Zeits. Malak.*, **6**: 140.

Amphidromus adamsi (Reeve), Wiegmann, 1894, *Zool. Ergebn. Ost-Indien*, **3**: 191, pl. 14, figs. 1–19, pl. 15, fig. 1 (anatomy); Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 82–84, pl. 5, figs. 1–14; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 221–228, pls. 69, 70; Thiele, 1908, *Mitteil. Zool. Mus. Berlin*, **4**: 262; Rensch, 1934, *Arch. f. Mollusk.*, **66**: 335–336.

Lectotype.—British Museum (Natural History) No. 19601422.

Distribution.—Borneo, Labuan, Banguey, Balambangan and Low Islands.

Classification.—*Amphidromus adamsii adamsii*.

alba von Moellendorff, 1901

Amphidromus metabletus pachychilus f. *alba* von Moellendorff, 1901, *Nachr. Malak. Gesell.*, **33**: 49—South Annam; Zilch, 1953, *Arch. f. Mollusk.*, **82**: 137, pl. 24, fig. 33.

Holotype.—Senckenberg Museum No. 122348.

Distribution.—South Annam.

Classification.—This form is an albinistic phase of *Amphidromus metabletus*.

albicans von Moellendorff, 1902

Amphidromus glaucolarynx albicans von Moellendorff, 1902, Nachr. Malak. Gesell., 34: 157—Siam; Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, figs. 2–3.

Lectotype.—Senckenberg Museum No. 28259.

Distribution.—Thailand.

Classification.—A color phase of *Amphidromus glaucolarynx*.

albocaerulescens Bavay, 1898

Amphidromus laosianus var. *albocaerulescens* Bavay, 1898, Jour. de Conch., 46: 16, pl. 2, figs. 2, 2a—upper Mekong Valley, Laos; Pilsbry, 1900, Man. Conch., (2), 13: 184, pl. 62, figs. 62–63.

Holotype.—Location unknown.

Distribution.—Khone, upper Mekong Valley, Laos.

Classification.—A color phase of *Amphidromus laosianus*.

albolabiata Fulton, 1896

Amphidromus suspectus var. *albolabiatus* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 79, pl. 6, fig. 9—Timor; Pilsbry, 1900, Man. Conch., (2), 13: 213, pl. 65, fig. 31.

Lectotype.—British Museum (Natural History) No. 96.6.13.27.

Distribution.—Timor.

Classification.—A color form of *Amphidromus contrarius contrarius*.

alticola Fulton, 1896

Amphidromus alticola Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 70, pl. 6, figs. 5, 5a—Java; Pilsbry, 1900, Man. Conch., (2), 13: 147, pl. 53, figs. 75–76; Gude, 1903, Jour. Malac., 10: 55; Leschke, 1914, Mitteil. Naturh. Mus. Hamburg, 31: 231; Oostingh, 1923, Meded. Landb. Hoogeschool., 26: 153; van Benthem Jutting, 1950, Treubia, 20: 491–492, fig. 98.

Lectotype.—British Museum (Natural History) No. 96.6.13.49.

Distribution.—Java at elevations 1,400 to 2,000 meters above sea level. The Leiden Museum has specimens labeled “Celebes, Busak,” which, if correct, is a surprising occurrence.

Classification.—*Amphidromus alticola*.

andamanensis Pfeiffer, 1871

Bulimus andamanensis Pfeiffer, 1871 (Mousson mss.), Nov. Conch., 4: 35–36, pl. 116, figs. 7–10—Andaman Islands (error).

Amphidromus perversus “Form 4” Smith, 1894, Ann. Mag. Nat. Hist., (6), 13: 457—Sirhassen Island (same material seen by Fulton).

Amphidromus inversus "small form" Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 70—Sarawak and Sirhassen Island.

Amphidromus inversus var. *andamanensis* (Pfeiffer), Pilsbry, 1900, Man. Conch., (2), 13: 168–169, pl. 56, figs. 94–97; Gude, 1914, Fauna Brit. India, Moll., 2: 178.

Amphidromus inversus (Müller), van Benthem Jutting, 1937, Basteria, 2, (3), p. 34.

Holotype.—Location unknown.

Distribution.—Borneo, Billiton Island and its satellites, and the South Natuna Islands. Not found in the Andaman or Nicobar Islands.

Classification.—*Amphidromus inversus andamanensis*.

andamanicus Hanley and Theobald, 1876

Bulimus andamanicus Hanley and Theobald, 1876 (Thorpe mss.), Conch. Indica, p. 59, pl. 148, fig. 10—Andaman Islands.

Amphidromus furcillatus var. *andamanica* (Hanley and Theobald), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 77.

Amphidromus andamanicus (Hanley and Theobald), Pilsbry, 1900, Man. Conch., (2), 13: 217–218, pl. 66, fig. 41; Gude, 1914, Fauna Brit. India, Moll., 2: 184–185.

Holotype.—Location unknown.

Distribution.—Andaman and Nicobar Islands.

Classification.—*Amphidromus furcillatus andamanicus*.

angulatus Fulton, 1896

Amphidromus angulatus Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 84–85, pl. 6, fig. 3—Sarawak.

Amphidromus adamsi angulatus Fulton, Pilsbry, 1900, Man. Conch., (2), 13: 226, pl. 70, fig. 61.

Lectotype.—British Museum (Natural History) No. 89.4.27.28.

Distribution.—Known from Sarawak.

Classification.—Status uncertain. May be an individual variation or a valid subspecies of *Amphidromus adamsii*.

annae von Martens, 1891

Amphidromus annae von Martens, 1891, Zool. Ergebni. Ost-Indien, 2: 240–241, pl. 14, figs. 19–22—Saleyer Island off South Celebes; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 87–88; Smith, 1896, Ann. Mag. Nat. Hist., (6), 18: 149, pl. 10, fig. 11; P. and F. Sarasin, 1899, Land-Moll. Celebes, p. 214; Pilsbry, 1900, Man. Conch., (2), 13: 203–204, pl. 64, figs. 13–16.

Holotype.—Zoological Museum, Berlin.

Distribution.—Saleyer Island, South Celebes.

Classification.—*Amphidromus annae*.

annamiticus Crosse and Fischer, 1863

Bulimus annamiticus Crosse and Fischer, 1863, Jour. de Conch., 11: 357-359—Saigon, Cochinchina; Crosse and Fischer, 1864, Jour. de Conch., 12: 329, pl. 12, fig. 8; Morelet, 1875, Ser. Conch., 4: 261; Morelet, 1889, Jour. de Conch., 37: 126.

Amphidromus inversus annamiticus (Crosse and Fischer), Pilsbry, 1900, Man. Conch., (2), 13: 169-170, pl. 56, figs. 98-100.

Amphidromus annamiticus (Crosse and Fischer), von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 50—South Annam.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Lower Mekong Valley, Cambodia and Thailand (var. *roseotincta*).

Classification.—*Amphidromus inversus annamiticus*.

apoensis Bartsch, 1917

Amphidromus apoensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 19-20, pl. 9, figs. 5-6—Mount Apo, Mindanao, Philippine Islands.

Holotype.—United States National Museum No. 244690.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus maculiferus multicolor*.

appressus von Martens, 1867

Bulimus appressus von Martens, 1867, Preuss. Exped. Ost-Asien, Zool., 2: 353—Java; Mousson, 1871, Nov. Conch., 4, (39), pp. 34-35, pl. 116, figs. 4-5.

Amphidromus appressus (von Martens), Boettger, 1890, Bericht. Senck. Naturf. Gesell., 21: 145-146, pl. 5, fig. 8.

Amphidromus palaceus var. *appressus* (von Martens), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 72; Pilsbry, 1900, Man. Conch., (2), 13: 136, pl. 46, fig. 15, pl. 47, fig. 7; Gude, 1903, Jour. Malac., 10: 55; Leschke, 1914, Mitteil. Naturh. Mus. Hamburg, 31: 212; van Benthem Jutting, 1950, Treubia, 20: 481.

Syntypes.—Zoologisches Museum der Universität Zurich 90-1-25.

Distribution.—West Java.

Classification.—A variety of *Amphidromus palaceus*.

areolatus Pfeiffer, 1861

Bulimus areolatus Pfeiffer, 1861, Proc. Zool. Soc. London, 1861: 194—Siam; Pfeiffer, 1861, Nov. Conch., 2: 172-173, pl. 46, figs. 11-12.

Amphidromus areolatus (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 81; Pilsbry, 1900, Man. Conch., (2), 13: 198-199, pl. 63, figs. 85-86.

Lectotype.—British Museum (Natural History) No. 19601430.

Distribution.—Thailand.

Classification.—Status uncertain. May be a synonym of *A. zebrinus*, which was also collected by Mouhot in Thailand and described on the same page as *areolatus*. Tentatively they are kept as distinct species.

articulata Fulton, 1896

Amphidromus adamsi var. *articulata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 82, pl. 5, fig. 7—Banguey Island; Pilsbry, 1900, Man. Conch., (2), 13: 222, pl. 69, fig. 36.

Lectotype.—British Museum (Natural History) No. 96.6.13.2.

Distribution.—Banguey Island.

Classification.—A color phase of *Amphidromus adamsii*.

asper Haas, 1934

Amphidromus bulowi Dautzenberg and Fischer, 1906 (not Fruhstorfer, 1905), Jour. de Conch., 53: 365-366, pl. 8, figs. 10-12—Lang-Bian, Annam.

Amphidromus (Goniodromus) asper Haas, 1934, Senckenbergiana, 16: 96, figs. 11-12—600-1000 meters, near Lang-Bian Plateau, South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 138, pl. 25, fig. 44.

Holotype.—Senckenberg Museum No. 7762.

Distribution.—South Annam.

Classification.—*Amphidromus asper*.

atjehensis Rensch, 1934

Amphidromus sumatranus atjehensis Rensch, 1934, Arch. f. Mollusk., 66: 333-336, pl. 14, figs. 5, 6—Lho Sukon, Atjeh, North Sumatra.

Holotype.—Zoological Museum, Berlin.

Distribution.—Atjeh, North Sumatra.

Classification.—Possibly a valid subspecies of *Amphidromus sumatranus*, although van Benthem Jutting (1959, p. 165) lists it as a synonym of the nominate subspecies.

atricallosus Gould, 1843

Bulimus atricallosus Gould, 1843, Proc. Boston Soc. Nat. Hist., 1: 140—Philippine Islands; Gould, 1844, Boston Jour. Nat. Hist., 4: 6, pl. 24, fig. 3; Pfeiffer, 1849, Zeits. Malak., 6: 131.

Bulimus eques Pfeiffer, 1857, Malak. Blätt., 4: 158.

Amphidromus perversus var. *atricallosus* (Gould), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 69.

Amphidromus atricallosus (Gould), Pilsbry, 1900, Man. Conch., (2), 13: 165–166, pl. 58, figs. 19–21; Gude, 1914, Fauna Brit. India, Moll., 2: 179–180.

Holotype.—Museum of Comparative Zoology, No. 169050.

Distribution.—Burma, Mergui Islands, possibly Penang and Saigon.

Classification.—*Amphidromus atricallosus*.

aurea Dillwyn, 1817 (not Martyn, 1784)

Helix aurea Dillwyn, 1817, Desc. Cat. Shells, 2: 936—locality not given.

Bulimus perversus aureus, von Martens, 1867, Preuss. Exped., Ost-Asien, 2: 349, pl. 20, fig. 13.

Holotype.—Location unknown.

Classification.—A form of *Amphidromus perversus*.

aureocincta Fulton, 1896

Amphidromus adamsi var. *aureocincta* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 83–84, pl. 5, fig. 3, a—North Borneo.

Amphidromus adamsi aureocinctus Fulton, Pilsbry, 1900, Man. Conch., (2), 13: 224, pl. 69, figs. 46–48.

Lectotype.—British Museum (Natural History) No. 96.6.13.34.

Distribution.—Known from the type collection only.

Classification.—A color form of *Amphidromus adamsii*.

aureus Martyn, 1784¹

Limax aureus Martyn, 1784, Univ. Conch., 3, pl. 115—no locality.

Helix perversa Linné, Donovan, 1824, Naturalist's Repository, 2: pl. 49, figs.—Prince's Island (=Pulau Panaitan) (error?).

Amphidromus aureus (Martyn), Pilsbry, 1900, Man. Conch., (2), 13: 160–162, pl. 54, figs. 70–72.

Holotype.—Location unknown.

Distribution.—Unknown.

Classification.—A form of *Amphidromus perversus*.

¹ Opinion 456 of the International Commission on Zoological Nomenclature invalidated Martyn's names, but invited applications to place individual names on the list of *nomina conservanda*. We continue to use Martyn's names.

Remarks.—The shells figured by Donovan (*loc. cit.*) have been found in the British Museum. They are members of the *perversus* complex and totally unlike the Pulau Panaitan species *banksi* Butot (which see). Probably Donovan's set was mislabeled as to locality.

baaguiae Forcart, 1936

Amphidromus contrarius baaguiae Forcart, 1936, Verh. Naturf. Gesell. Basel, 47: 143-144, fig. 6—Baaguia, east Timor.

Holotype.—Naturhistorisches Museum Basel No. 4175a.

Distribution.—Known from the type collection only.

Classification.—*Amphidromus contrarius baaguiae*.

babiensis Laidlaw, 1954

Amphidromus webbi babiensis Laidlaw, 1954, Zool. Meded., 33: 76-78, fig. 1—Babi Island, Simalur, northwest Sumatra.

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden No. "Amphidromus 12' a."

Distribution.—Known from the type collection only.

Classification.—*Amphidromus webbi babiensis*.

banksi Butot, 1955

Amphidromus banksi Butot, 1955, Treubia, 23: 127-129, pl. 5, text fig. 29 a-e—Panaitan (Prince's) Island, West Java.

Holotype.—Zoologisch Museum, Amsterdam.

Distribution.—Known from the type collection only.

Classification.—*Amphidromus banksi*.

bartschi nom. nov.

Amphidromus maculiferus webbi Bartsch, 1919 (not Fulton, 1907), Proc. Biol. Soc. Washington, 32: 183—Cabacan, Cotabato, Mindanao, Philippine Islands.

Holotype.—United States National Museum No. 217035.

Distribution.—Known from the type collection only.

Classification.—A form of *Amphidromus maculiferus buluanensis*.

basilanensis Bartsch, 1917

Amphidromus basilanensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 20, pl. 9, fig. 3—Basilan Island, Philippines.

Holotype.—United States National Museum No. 244691.

Distribution.—Known from the type locality only.

Classification.—A relatively small form of *Amphidromus maculiferus multicolor*.

bataviae Grateloup, 1840

Partula bataviae Grateloup, 1840, *Actes Soc. Linn. Bordeaux*, **11**: 425, pl. 2, fig. 2—Java (error?).

?*Bulimus sinistralis* von Martens, 1867, *Ostas. Landschn.*, p. 398.

Amphidromus bataviae (Grateloup), Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 79.

Amphidromus sinistralis (von Martens), Pilsbry, 1900, *Man. Conch.*, (2), **13**: 232–233, pl. 65, fig. 34.

Amphidromus adamsi var. *rubiginosa* (Fulton), Fulton, 1909, *Proc. Malac. Soc. London*, **8**: 44.

Lectotype.—British Museum (Natural History) No. 1907.11.22.25.

Distribution.—Unknown.

Classification.—Incertae sedis.

Remarks.—The status of this name has been uncertain for over 120 years. Despite availability of a lectotype that shows *bataviae* to be the same as *A. adamsii*, we chose not to replace the well-known name *adamsii* by the unknown name *bataviae*.

bawanicus Fruhstorfer, 1905

Amphidromus contrarius bawanicus Fruhstorfer, 1905, *Nachr. Malak. Gesell.*, **37**: 198–199—Bawean Island, Java; Rensch, 1931, *Zool. Jahrb., Syst.*, **61**: 196; Zilch, 1953, *Arch. f. Mollusk.*, **82**: 131, pl. 22, fig. 1.

Amphidromus filozonatus von Martens, van Benthem Jutting, 1941, *Arch. Neerland. Zool.*, **5**: 313–314.

Lectotype.—Senckenberg Museum No. 7535a.

Distribution.—Known from the type locality only.

Classification.—*Amphidromus filozonatus bawanicus*.

beccarii Tapparone-Canevari, 1883. Figures 30, 31 (p. 576).

Bulimus (Amphidromus) beccarii Tapparone-Canevari, 1883, *Ann. Mus. Civ. Genova*, **20**: 170, pl. 1, figs. 10–11—Kandari, southeast peninsula of Celebes.

Amphidromus beccarii Tapparone-Canevari, Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 74; P. & F. Sarasin, 1899, *Land-Moll. Celebes*, p. 214; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 140–141, pl. 68, figs. 21–22; Bollinger, 1918, *Rev. Suisse Zool.*, **26**: 332.

Holotype.—Museo Civico di Storia Naturale, Genova.

Distribution.—Kandari and Pundidaha, southeast Celebes.

Classification.—*Amphidromus beccarii*.

begini Morlet, 1886

Bulimus (Amphidromus) begini Morlet, 1886, Jour. de Conch., 34: 74—Stung-Trang Plateau, Cambodia.

Amphidromus begini Morlet, 1889, Jour. de Conch., 37: 128; Pilsbry, 1900, Man. Conch., (2), 13: 188, pl. 59, figs. 28-29.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Cambodia.

Classification.—*Amphidromus begini*.

bifasciata Bavay and Dautzenberg, 1909

Amphidromus perryi var. bifasciata Bavay and Dautzenberg, 1909, Jour. de Conch., 57: 279-281, pl. 9, figs. 8-9—locality not given.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Known only from the type specimens.

Classification.—A color form of *Amphidromus dautzenbergi*.

bilatanensis Bartsch, 1917

Amphidromus maculiferus var., Smith, 1894, Ann. Mag. Nat. Hist., (6), 13: 55, pl. 4, figs. 9, 9a.

Amphidromus bilatanensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 23, pl. 10, figs. 4-5—Bilatan Island, Mindanao, Philippine Islands.

Holotype.—Described from illustrations without seeing any specimens.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus chloris roeseleri*.

Remarks.—Bartsch (1917, p. 4) by a *lapsus calami* referred to *bilatanensis* as “*philippinensis*.”

bipartita von Moellendorff, 1901

Amphidromus rhodostylus forma *bipartita* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—Pha-Rang, South Annam.

Amphidromus (Syndromus) rhodostylus f. *bipartita* von Moellendorff, Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 17.

Holotype.—Senckenberg Museum No. 122342.

Distribution.—Known only from the type locality.

Classification.—A color form of *Amphidromus rhodostylus*.

boholensis Bartsch, 1917

Amphidromus maculiferus boholensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 16, pl. 1, fig. 2, pl. 7, figs. 1-3 (figures 1 and 2 were transposed on the plate).

Holotype.—United States National Museum No. 245563.

Distribution.—Bohol Island, Philippine Islands.

Classification.—A synonym of *Amphidromus maculiferus multicolor*.

borneensis Pilsbry, 1900

Amphidromus interruptus var. *borneensis* Pilsbry, 1900, Man. Conch., (2), 13: 153, pl. 50, figs. 39 (lectotype), 40—southeast Borneo.

Lectotype.—Academy of Natural Sciences, Philadelphia No. 79506.

Distribution.—East and southeast Borneo.

Classification.—A variety of *Amphidromus perversus perversus*.

bülowi Fruhstorfer, 1905. Figure 37 (p. 589).

Amphidromus bülowi Fruhstorfer, 1905, Nachr. Malak. Gesell., 37: 83-84, pl. 1, fig. 2 (lectotype is lower figure)—west Sumatra; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 165.

Amphidromus (Goniodromus) bülowi Fruhstorfer, 1905, Nachr. Malak. Gesell., 37: 83-84; Rolle, 1908, Nachr. Malak. Gesell., 40: 67—Padang Sikeh, Singalang, Sumatra, at 4,000-5,000 feet.

Lectotype.—British Museum (Natural History) No. 1910.12.30.98.

Distribution.—Sumatra.

Classification.—*Amphidromus (Goniodromus) bülowi*.

buluanensis Bartsch, 1917

Amphidromus maculiferus buluanensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 13, pl. 5, figs. 1-6—between Simipatan and Buluan, Mindanao, Philippine Islands.

Holotype.—United States National Museum No. 244688.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus maculiferus buluanensis*.

bungiensis Pilsbry, 1900. Figure 33 (p. 578).

Amphidromus contrarius var. *subconcolor* P. and F. Sarasin, 1899 (not von Martens, 1867), Land-Moll. Celebes, p. 210, pl. 26, fig. 258—Bungi, Gulf of Mandar, southwest Celebes.

Amphidromus maculatus bungiensis Pilsbry, 1900, Man. Conch., (2), 13: 250, pl. 64, fig. 12—new name for *subconcolor* P. and F. Sarasin.

Lectotype.—Naturhistorisches Museum Basel No. 4985a.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus maculatus bungiensis*.

busuangensis Bartsch, 1917

Amphidromus entobaptus busuangensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 32, pl. 16, figs. 4–9—Busuanga, Calamianes, Philippine Islands.

Holotype.—United States National Museum No. 215643.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus entobaptus contractus*.

butoti, new subspecies (see p. 535). Figures 15, B, C, 16, D (opposite p. 516).

Holotype.—Zoologisch Museum, Amsterdam.

Distribution.—Sepandjang, Bajutan, and Djukung, Kangean Islands.

Classification.—*Amphidromus perversus butoti*.

calista Pilsbry, 1900

Amphidromus chloris var. *calista* Pilsbry, 1900, Man. Conch., (2), 13: 144, pl. 50, fig. 36—Basilan, Philippine Islands.

Amphidromus calista Pilsbry, Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 23–24, pl. 11, figs. 1 (lectotype) –3.

Lectotype.—Academy of Natural Sciences, Philadelphia No. 106458.

Distribution.—Basilan, Philippine Islands.

Classification.—A color phase of *Amphidromus chloris*.

cambojiensis Reeve, 1860

Bulimus cambojiensis Reeve, 1860, Ann. Mag. Nat. Hist., (3), 6: 204—60 leagues north of Saigon, Cochinchina.

Amphidromus cambojiensis (Reeve), Fischer, 1891, Soc. d'hist. Nat. d'Autun, 4: 30; Pilsbry, 1900, Man. Conch., (2), 13: 177–178, pl. 59, fig. 32.

Holotype.—Location unknown.

Distribution.—Cambodia.

Classification.—*Amphidromus cambojiensis*.

canabunganensis Bartsch, 1919

Amphidromus versicolor canabunganensis Bartsch, 1919, Proc. Biol. Soc. Washington, **32**: 182-183—Canabungan Island, Palawan, Philippine Islands; Zilch, 1953, Arch. f. Mollusk., **82**: 134.

Holotype.—United States National Museum No. 336030.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi quadrasi* var. *versicolor*.

capistratus von Martens, 1903

Amphidromus martensi var. *capistratus* von Martens, 1903, Sitz.-Ber. Gesell. Naturf. Fr. Berlin, **1903**: 424, text-fig.—Kutei Sultanate, East Borneo.

Amphidromus capistratus von Martens, Thiele, 1908, Mittheil. Zool. Mus. Berlin, **4**: 286-287.

Holotype.—Zoological Museum, Berlin.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus martensi*.

cataganensis Bartsch, 1917

Amphidromus maculiferus cataganensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, **1**, pt. 1, pp. 11-12, pl. 3, figs. 1-5—Mount Malindang, Catagan, Mindanao, Philippine Islands, at 1,100 feet elevation.

Holotype.—United States National Museum No. 244672.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus maculiferus maculiferus*.

caxisiganensis Bartsch, 1918

Amphidromus quadrasi caxisiganensis Bartsch, 1918, Jour. Washington Acad. Sci., **8**: 362—Caxisigan Island, Palawan, Philippine Islands.

Holotype.—United States National Museum No. 215603.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi quadrasi*.

centrocelebensis Bollinger, 1918. Figure 32 (p. 577).

Amphidromus centrocelebensis Bollinger, 1918, Rev. Suisse Zool., **26**: 332-333, pl. 11, fig. 15—Sakedi, Palu Valley, central Celebes.

Lectotype.—Naturhistorisches Museum Basel No. 2371b.

Distribution.—Known only from the type collection.

Classification.—*Amphidromus centrocelebensis*.

chloris Reeve, 1848

Bulimus chloris Reeve, 1848, Conch. Icon., *Bulimus*, pl. 37, fig. 223—eastern islands; Pfeiffer, 1849, Zeits. Malak., 6: 137.

Amphidromus chloris (Reeve), Semper, 1874, Reisen im Philippinen, 3: 148 (anatomy); Pilsbry, 1900, Man. Conch., (2), 13: 142–144, pl. 50, figs. 28–38; Kobelt, 1916, in SEMPER, Reisen im Philippinen, 10: 344–345, pl. 78, figs. 11–12; Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 24–26, pl. 1, fig. 4, pl. 12, figs. 1–6, 8—Zamboanga, Mindanao.

Lectotype.—British Museum (Natural History) No. 19601424.

Distribution.—Southwest of Mindanao and islands forming the southeast margin of the Sulu Sea.

Classification.—*Amphidromus chloris chloris*.

Remarks.—Jacobi (1895, p. 293, pl. 14) figured the anatomy of an *Amphidromus* from Djemadja, Anamba Islands, under the name *A. chloris*. This is almost certainly a misidentification, but the shell of the dissected specimen was not discussed and its location is unknown. It is impossible to determine at present which species was actually dissected.

citrinus Bruguière, 1792

Bulimus citrinus Bruguière, 1792, Encycl. Meth., p. 313; Pfeiffer, 1849, Zeits. Malak., 6: 131; Morlet, 1889, Jour. de Conch., 37: 127.

Holotype.—Location unknown.

Distribution.—Thailand.

Classification.—A synonym of *Amphidromus perversus*.

clausus Pilsbry, 1900

Amphidromus xiengensis var. *clausus* Pilsbry, 1900, Man. Conch., (2), 13: 195–196, pl. 63, figs. 79–82 (lectotype figs. 81 and 82)—mountains of Laos.

Lectotype.—Academy of Natural Sciences, Philadelphia No. 31496.

Distribution.—Known from the type lot only.

Classification.—A variety of *Amphidromus xiengensis*.

cochinchinensis Pfeiffer, 1857. Figure 39 (p. 591)

Bulimus cochinchinensis Pfeiffer, 1857, Proc. Zool. Soc. London, 1856: 331—Cochin China; Crosse and Fischer, 1863, Jour. de Conch., 11: 360.

Amphidromus cochinchinensis (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 69, pl. 6, fig. 6 (lectotype); Pilsbry, 1900, Man. Conch., (2), 13: 177, pl. 54, fig. 69.

Lectotype.—British Museum (Natural History) No. 19601432.

Distribution.—Cochinchina.

Classification.—*Incertae sedis*.

coeruleus Clench and Archer, 1932. Figure 16, B (opposite p. 516).

Amphidromus coeruleus Clench and Archer, 1932, Occ. Pap. Boston Soc. Nat. Hist., 8: 41–42, pl. 4, figs. E, F—one-half mile above fort at Long Loba, Ninja River, Sarawak, North Borneo.

Holotype.—Museum of Comparative Zoology, No. 44991.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus coeruleus*.

cognatus Fulton, 1907

Amphidromus cognatus Fulton, 1907, Ann. Mag. Nat. Hist., (7), 19: 151, pl. 9, fig. 7—locality unknown.

Holotype.—British Museum (Natural History) No. 1907.5.3.122.

Distribution.—Unknown.

Classification.—*Incertae sedis*.

columellaris von Moellendorff, 1892

Amphidromus columellaris von Moellendorff, 1892, Nachr. Malak. Gesell., 24: 98–99, pl. 1, fig. 9—Tenimber Islands; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 79; Fulton, 1898, Proc. Malac. Soc. London, 3: 213; Pilsbry, 1900, Man. Conch., (2), 13: 213–214, pl. 65, figs. 32–33; Zilch, 1953, Arch. f. Mollusk., 82: 131.

Amphidromus contrarius columellaris (von Moellendorff), Rensch, 1932, Zool. Jahrb., Syst., 63: 96.

Lectotype.—Senckenberg Museum No. 7553.

Distribution.—Tenimber Islands.

Classification.—*Amphidromus columellaris*.

comes Pfeiffer, 1861

Bulimus comes Pfeiffer, 1861, Proc. Zool. Soc. London, 1861: 193–194—Cambodia; Pfeiffer, 1866, Nov. Conch., 3: 311, pl. 75, figs. 10–11.

Amphidromus comes (Pfeiffer), Morlet, 1889, Jour. de Conch., 37: 126–127; Pilsbry, 1900, Man. Conch., (2), 13: 170–173, pl. 57, figs. 1–5.

Lectotype.—British Museum (Natural History) No. 19601434.

Distribution.—Annam and Cochinchina.

Classification.—*Amphidromus comes*.

concinna Fulton, 1896. Figure 34 (p. 580).

Amphidromus pictus var. *concinna* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 85, pl. 5, fig. 9—Kinabalu, North Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 226–227, pl. 70, fig. 63.

Lectotype.—British Museum (Natural History) No. 96.6.13.18.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus pictus*.

confluens von Moellendorff, 1891

Amphidromus metabletus pachychilus forma *confluens* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 49—Nha-Trang, South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 25, fig. 37.

Holotype.—Senckenberg Museum No. 122354.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus metabletus pachychilus*.

connectans Fulton, 1896

Amphidromus everetti var. *connectans* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 87, pl. 5, fig. 17 (on the plate this figure is incorrectly numbered "18")—North Borneo.

Amphidromus pictus color-form *connectans* Fulton, Pilsbry, 1900, Man. Conch., (2), 13: 227–228, pl. 70, fig. 69.

Lectotype.—British Museum (Natural History) No. 96.6.13.33.

Distribution.—Unknown.

Classification.—Probably a color form of *Amphidromus quadrasi everetti*.

consobrinus Fulton, 1897

Amphidromus consobrinus Fulton, 1897, Ann. Mag. Nat. Hist., (6), 20: 211–212, pl. 6, fig. 3—South Flores Island, Sumba Island; Pilsbry, 1900, Man. Conch., (2), 13: 208–209, pl. 67, fig. 9; van Benthem Jutting, 1928, Treubia, 10: 159.

Amphidromus latestrigatus Schepman, Rensch, 1932, Zool. Jahrb., Syst., 63: 99–100.

Lectotype.—British Museum (Natural History) No. 97.8.3.41.

Distribution.—Sumba, Bali, and Flores.

Classification.—A color form of *Amphidromus latestrigatus*.

contractus Kobelt, 1916

Amphidromus entobaptus var. *contracta* von Moellendorff, 1898, Abh. Nat. Gesell. Gorlitz, 22: 148 (nomen nudum).

Amphidromus entobaptus contracta Kobelt, 1916, in SEMPER, Reisen im Philip-
pinen, 10: 344, pl. 78, figs. 9–10—Koron Island, Calamianes, Philippines;
Zilch, 1953, Arch. f. Mollusk., 82: 135.

Amphidromus entobaptus coronensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100,
1, pt. 1, pp. 31–32, pl. 15, figs. 6–8—Coron Island, Calamianes, Philippine
Islands.

Holotype.—Senckenberg Museum No. 7661.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus entobaptus contractus*.

contrarius Müller, 1774

Helix contraria Müller, 1774, Hist. Verm. terr. fluv., 2: p. 95—no locality.

Amphidromus contrarius (Müller), Wallace, 1865, Proc. Zool. Soc. London,
1865: 412—Timor; Morlet, 1889, Jour. de Conch., 37: 127; von Moellen-
dorff, 1892, Nachr. Malak. Gesell., 24: 99; Fulton, 1898, Proc. Malac. Soc.
London, 3: 213; Pilsbry, 1900, Man. Conch., (2), 13: 210–212, pl. 65,
figs. 22–27; Haniel, 1921, Zeits. Induct. Abstamm. Vererbungsl., 25: 1–88,
pls. 1–5; Rensch, 1931, Zool. Jahrb., Syst., 60: 449–452; Rensch, 1932,
op. cit., 63: 95–97; Rensch, 1934, Arch. f. Mollusk., 66: 336; Forcart, 1936,
Verh. Naturf. Gesell., Basel, 47: 143–144; van Benthem Jutting, 1953,
Treubia, 22: 318.

Bulimus contrarius (Müller), Pfeiffer, 1849, Zeits. Malak., 6: 137–138; von
Martens, 1867, Ostas. Landschn., p. 363, pl. 21, fig. 7 a–c.

Holotype.—Zoological Museum, Copenhagen.

Distribution.—Timor, Rotti and Samau Islands.

Classification.—*Amphidromus contrarius*.

contusus Reeve, 1848

Bulimus contusus Reeve, 1848, Conch. Icon., *Bulimus*, pl. 37, fig. 220—
eastern islands.

Lectotype.—British Museum (Natural History) No. 19601426.

Classification.—A synonym of *Amphidromus inversus*.

coronensis Bartsch, 1917

Amphidromus entobaptus coronensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100,
1, pt. 1, pp. 31–32, pl. 15, figs. 6–8—Coron Island, Calamianes, Philippine
Islands.

Holotype.—United States National Museum No. 195848a.

Classification.—A synonym of *Amphidromus entobaptus contractus*.

cosmius Bartsch, 1917

Amphidromus maculiferus cosmius Bartsch, 1917, U. S. Nat. Mus., Bull. 100,
1, pt. 1, pp. 18–19, pl. 9, fig. 4—Basilan Island, Philippine Islands.

Holotype.—United States National Museum No. 245562.

Distribution.—Basilan Island, Philippine Islands.

Classification.—A form of *Amphidromus maculiferus multicolor*.

costifer Smith, 1893. Figure 40 (p. 591).

Amphidromus costifer Smith, 1893, Proc. Malac. Soc. London, 1: 12, fig.—Binh-Dinh Province, Annam; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 91, pl. 7, figs. 6, 6a; von Moellendorff, 1898, Nachr. Malak. Gesell., 30: 75; Pilsbry, 1900, Man. Conch., (2), 13: 176-177, pl. 59, figs. 22-23.

Holotype.—British Museum (Natural History) No. 93.2.26.4.

Distribution.—Known only from the type locality.

Classification.—Incertae sedis.

cotabatensis Bartsch, 1917

Amphidromus maculiferus cotabatensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 12-13, pl. 1, fig. 1, pl. 4, figs. 1-8—Cotabato, Mindanao, Philippine Islands; Zilch, 1953, Arch. f. Mollusk., 82: 135.

Holotype.—United States National Museum No. 244676.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus maculiferus maculiferus*.

crassa Fulton, 1899

Amphidromus contrarius var. *crassa* Fulton, 1899, Proc. Malac. Soc. London, 3: 213, 215, pl. 11, fig. 8—Oinainia, southwest Timor; Pilsbry, 1900, Man. Conch., (2), 13: 212, pl. 65, fig. 29.

Lectotype.—British Museum (Natural History) No. 98.12.3.323.

Distribution.—Southwest Timor.

Classification.—A color phase of *Amphidromus contrarius contrarius*.

crossei Pfeiffer, 1862

Bulimus crossei Pfeiffer, 1862, Jour. de Conch., 10: 43, pl. 5, fig. 1—Siam; Crosse and Fischer, 1863, Jour. de Conch., 11: 358.

Amphidromus schomburgki var. *crossei* (Pfeiffer), Pilsbry, 1900, Man. Conch., (2), 13: 182, pl. 59, fig. 31.

Holotype.—Location unknown.

Distribution.—Thailand.

Classification.—A small decorticated form of *Amphidromus schomburgki*.

cruentatus Morelet, 1875

Bulimus cruentatus Morelet, 1875, Ser. Conch., 4: 264-265, pl. 13, fig. 5.

Amphidromus cruentatus (Morelet), Fischer, 1891, Soc. d'hist. Nat. d'Autun, 4: 31; Pilsbry, 1900, Man. Conch., (2), 13: 187, pl. 60, figs. 39-40; Laidlaw, 1933, Jour. Malayan Br. Roy. Asiatic Soc., 11, (2), p. 230—Gapis, Perak; Iredale, 1943, Nautilus, 57, (1), p. 16.

Holotype.—British Museum (Natural History) No. 93.2.4.163.

Distribution.—Upper Perak, Thailand, Cambodia.

Classification.—*Amphidromus cruentatus*.

culionensis Bartsch, 1917

Amphidromus entobaptus culionensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 31, pl. 1, fig. 6, pl. 14, figs. 4-9—Culion Island, Calamianes, Philippine Islands.

Holotype.—United States National Museum No. 215642.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus entobaptus contractus*.

daflaensis Godwin-Austen, 1878

Amphidromus daflaensis Godwin-Austen, Nevill, 1878, Hand List Moll. Indian Mus., 1: 127 (*nomen nudum*).

Classification.—Equated with *Amphidromus masoni*.

dautzenbergi Fulton, 1899

Amphidromus dautzenbergi Fulton, 1899, Proc. Malac. Soc. London, 3: 302-303, fig. 3—Tonkin; Pilsbry, 1900, Man. Conch., (2), 13: 166, pl. 62, fig. 66.

Amphidromus perversibilis Bavay and Dautzenberg, 1909, Jour. de Conch., 57: 279-280, pl. 9, figs. 6-10, pl. 10, figs. 1-10.

Holotype.—British Museum (Natural History) No. 99.12.18.38.

Distribution.—Tonkin.

Classification.—*Amphidromus dautzenbergi*.

decolor Tapparone-Canevari, 1884

Bulimus sinistralis var. *decolor* Tapparone-Canevari, 1883, Ann. Mus. Civ. Genova, 20: 147—Moluccas (error).

Amphidromus sinistralis var. *decolor* (Tapparone-Canevari), Pilsbry, 1900, Man. Conch., (2), 13: 233.

Holotype.—Museo Civico di Storia Naturale, Genova.

Distribution.—Celebes.

Classification.—A color phase of *Amphidromus sinistralis*.

demesai Bartsch, 1946

Amphidromus versicolor demesai Bartsch, 1946, *Nautilus*, **60**, (2), pp. 63-64, pl. 6, fig. 3—Coron Island, Calamianes, Philippine Islands.

Holotype.—United States National Museum No. 542919.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi everetti*.

dextra "Müller, 1774"

Remarks.—A descriptive term for dextral individuals of *A. per-versus* adopted by later authors and credited to Müller.

dextrorsus Pfeiffer, 1853

Bulimus inversus B dextrorsus Pfeiffer, 1853, *Monog. Helic. Viv.*, **3**: 318, 319.

Amphidromus maculiferus var. *obscura* Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 75—Mindanao, Philippine Islands.

Holotype.—Location unknown.

Classification.—A descriptive term for dextral individuals of *Amphidromus maculiferus*.

dohrni Pfeiffer, 1863

Bulimus dohrni Pfeiffer, 1863, *Proc. Zool. Soc. London*, **1863**: 525—Cochin-china; Crosse and Fischer, 1864, *Jour. de Conch.*, **12**: 329-330; Pfeiffer, 1866, *Nov. Conch.*, **3**: 312, pl. 75, figs. 12-13.

Bulimus perversus var. *dohrni* Pfeiffer, Morelet, 1875, *Ser. Conch.*, **4**: 260.

Amphidromus dohrni (Pfeiffer), Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 72 (exclusive of synonym); Pilsbry, 1900, *Man. Conch.*, (2), **13**: 173, pl. 58, figs. 11-13, pl. 59, figs. 24-27.

Lectotype.—British Museum (Natural History) No. 19601440.

Distribution.—Cochinchina.

Classification.—*Amphidromus dohrni*.

dubius Fulton, 1896

Amphidromus dubius Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 86-87, pl. 6, figs. 1, 1a—Balabac Island, Philippine Islands; Kobelt, 1916, in *SEMPER, Reisen im Philippinen*, **10**: 349-350, pl. 80, figs. 8-9, pl. 81, figs. 1-2.

Amphidromus quadrasi (part) Pilsbry, 1900, *Man. Conch.*, (2), **13**: 231, pl. 71, figs. 79-83.

Amphidromus quadrasi dubius Bartsch, 1917, *U. S. Nat. Mus., Bull.* **100**, **1**, pt. 1, pp. 38-39, pl. 1, fig. 10, pl. 19, figs. 2, 4-6, 8, 9, pl. 20, fig. 2.

Lectotype.—British Museum (Natural History) No. 96.6.13.6.

Distribution.—Balabac, Philippine Islands.

Classification.—*Amphidromus quadrasi quadrasi* var. *dubius*.

duplocincta Fulton, 1896

Amphidromus adamsi var. *duplocincta* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 82, pl. 5, fig. 4—Banguey Island, Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 222, pl. 69, figs. 37–38.

Holotype.—British Museum (Natural History) No. 96.6.13.5.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus adamsii*.

elegans Mousson, 1849 (not Pfeiffer, 1848)

Bulimus elegans Mousson, 1848, Mitt. naturf. Gesell., Zurich, 1: 226; Mousson, 1849, Land. und Süssw. Moll., Java, pp. 32–33, 115, pl. 3, fig. 3—Java.

Classification.—This species is now known as *Amphidromus furcillatus*.

elongatus Hombron and Jacquinot, 1854

Bulimus elongatus Hombron and Jacquinot, 1854, Voy. au Pol. Sud., Moll., pl. 8, figs. 3–4.

Classification.—This is a synonym of *Amphidromus inversus*.

emaciatus von Martens, 1867.

Bulimus emaciatus von Martens, 1867, Ostas. Landschn., p. 347, pl. 20, fig. 7—Surabaya, Java.

Amphidromus perversus emaciatus (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 153–154, pl. 53, figs. 77–78.

Amphidromus interruptus emaciatus (von Martens), Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 232.

Amphidromus perversus interruptus var. *emaciatus* (von Martens), van Benthem Jutting, 1950, Treubia, 20: 490–491.

Holotype.—Location unknown.

Distribution.—Central and eastern Java.

Classification.—*Amphidromus perversus emaciatus*.

enganoensis Fulton, 1896

Amphidromus enganoensis Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 71, pl. 6, fig. 11—Engano Island, west Sumatra; Henderson, 1898, Nautilus, 12, (2), p. 15; Pilsbry, 1900, Man. Conch., (2), 13: 157–158, pl. 61, figs. 53–56; Fruhstorfer, 1905, Nachr. Malak. Gesell., 37: 200; van Benthem Jutting, 1937, Treubia, 16: 50; Zilch, 1953, Arch. f. Mollusk., 82: 134, pl. 23, figs. 23–24.

Holotype.—British Museum (Natural History) No. 96.6.13.40.
Distribution.—Engano and Pulau Dua Islands, west Sumatra.
Classification.—*Amphidromus enganoensis enganoensis*.

entobaptus Dohrn, 1889

Amphidromus entobaptus Dohrn, 1889, Nachr. Malak. Gesell., 21: 62–63—
locality unknown; Pilsbry, 1900, Man. Conch., (2), 13: 145–147, pl. 51,
figs. 42–46.

Amphidromus perrersus var. *entobapta* Dohrn, Fulton, 1896, Ann. Mag. Nat.
Hist., (6), 17: 67–68—Paragua Island, Philippine Islands.

Amphidromus entobaptus entobaptus Dohrn, Bartsch, 1917, U. S. Nat. Mus.,
Bull. 100, 1, pt. 1, pp. 28–29, pl. 13, figs. 4–9.

Holotype.—Location unknown.

Distribution.—Palawan Island, Philippines.

Classification.—*Amphidromus entobaptus entobaptus*.

eques Pfeiffer, 1857

Bulimus eques Pfeiffer, 1857, Malak. Blätt., 4: 158—Cochin China; Crosse
and Fischer, 1863, Jour. de Conch., 11: 359.

Lectotype.—British Museum (Natural History) No. 19601442.

Classification.—A synonym of *Amphidromus atricallosus*.

eudeli Ancey, 1897

Amphidromus eudeli Ancey, 1897, Nautilus, 11, (6), p. 63—Annam.

Amphidromus zebrinus var. *eudeli* Ancey, Pilsbry, 1900, Man. Conch., (2), 13:
199–200, pl. 63, figs. 87–88.

Holotype.—Institut Royal des Sciences Naturelles de Belgique.

Distribution.—Annam.

Classification.—A color phase of *Amphidromus zebrinus*.

everetti Fulton, 1896. Figure 36 (p. 582).

Amphidromus everetti Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 87—
Palawan, Philippine Islands; Kobelt, 1916, in SEMPER, Reisen im Philip-
pinen, 10: 352, pl. 81, figs. 15–18.

Amphidromus quadrasi var. *everetti* Fulton, Pilsbry, 1900, Man. Conch., (2),
13: 231, pl. 70, figs. 65–68.

Amphidromus quadrasi dubius Bartsch (part), Bartsch, 1917, U. S. Nat.
Mus., Bull. 100, 1, pt. 1, pp. 38–39, pl. 1, fig. 10, pl. 19, figs. 2, 4–6, 8, 9,
pl. 20, fig. 2.

Amphidromus versicolor everetti Fulton, Bartsch, 1918, Jour. Washington Acad.
Sci., 8: 363.

Lectotype.—British Museum (Natural History) No. 93.3.5.56
(specimen figured in Ann. Mag. Nat. Hist., (6), 11, pl. 18, fig. 12).

Distribution.—Palawan, Philippine Islands.

Classification.—*Amphidromus quadrasi everetti*.

fasciata von Martens, 1867

Bulimus schomburgki var. *fasciata* von Martens, 1867, Ostas. Landschn., p. 80, pl. 21, figs. 1a, 1b—Petchaburi, Siam.

Amphidromus glaucolarynx var. *fasciata* (von Martens), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 90, pl. 7, fig. 3; Pilsbry, 1900, Man. Conch., (2), 13: 181, pl. 60, figs. 46–48.

Holotype.—Location unknown.

Classification.—A color phase of *Amphidromus glaucolarynx*.

flava von Moellendorff, 1901 (see p. 646)

fasciata P. and F. Sarasin, 1899 (not von Martens, 1867). Figure 29, A (p. 574).

Amphidromus sinistralis var. *fasciata* P. and F. Sarasin, 1899, Land-Moll. Celebes, p. 213, pl. 26, fig. 261—Gorontalo, Celebes; Pilsbry, 1900, Man. Conch., (2), 13: 233, pl. 68, fig. 26.

Holotype.—Naturhistorisches Museum Basel No. 769-h.

Distribution.—Celebes.

Classification.—A color phase of *Amphidromus sinistralis*.

filozonatus von Martens, 1867

Bulimus filozonatus von Martens, 1867, Ostas. Landschn., pp. 358–359, pl. 21, fig. 4—Grisse, East Java.

Amphidromus filozonatus (von Martens), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 78; Pilsbry, 1900, Man. Conch., (2), 13: 202, pl. 64, fig. 4; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 231; Rensch, 1931, Zool. Jahrb., Syst., 61: 96; van Benthem Jutting, 1941, Arch. Neerland. Zool., 5: 314; van Benthem Jutting, 1950, Treubia, 20: 495–496, fig. 101.

Syntypes.—Zoologisch Museum der Universität Zürich, 90-2-3.

Distribution.—Madura, central and eastern Java, Bawean and Sumbawa.

Classification.—*Amphidromus filozonatus filozonatus*.

flammea “Chemnitz”

Classification.—A name adopted from a non-binomial work to refer to a color phase of *Amphidromus perversus*. Used in varying senses by authors of 60 to 90 years ago, but subsequently ignored. It has no current definite nomenclatural status and is best forgotten.

flammulatus von Martens, 1867

Bulimus furcillatus *flammulatus* von Martens, 1867, Ostas. Landschn., p. 358
—Pangang-Lele, East Java.

Amphidromus furcillatus var. *flammulatus* (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 217.

Holotype.—Location unknown.

Classification.—A synonym of *Amphidromus furcillatus*.

flavus Pfeiffer, 1861

Bulimus flavus Pfeiffer, 1861, Proc. Zool. Soc. London, 1861: 194—Siam;
Pfeiffer, 1861, Nov. Conch., 2: 171, pl. 46, figs. 7–8.

Amphidromus flavus (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 81; Pilsbry, 1900, Man. Conch., (2), 13: 197–198, pl. 63, figs. 92–93.

Lectotype.—British Museum (Natural History) No. 19601436.

Distribution.—Laos, Thailand, North Malaya.

Classification.—*Amphidromus flavus*.

floresi Bartsch, 1917

Amphidromus floresi Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 20–21, pl. 8, fig. 3—southeastern Mindanao.

Holotype.—United States National Museum No. 215580.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus maculiferus multicolor*.

floresi Haltenorth and Jaeckel, 1940 (not Bartsch, 1917)

Amphidromus contrarius floresi Haltenorth and Jaeckel, 1940 (not Bartsch, 1917), Arch. f. Mollusk., 72: 174, figs. 3–4—Kampung Mosena, west Flores.

Amphidromus contrarius jaeckeli Laidlaw, in BUTOT, 1954, Penggemar Alam, 34: 106–107, fig. 3—new name for *floresi* Haltenorth and Jaeckel, 1940 (not Bartsch, 1917).

Holotype.—Zoologisch Museum, Berlin.

Distribution.—Komodo Islands.

Classification.—*Amphidromus poecilochrous jaeckeli*.

floresianus Fulton, 1897

Amphidromus floresianus Fulton, 1897, Ann. Mag. Nat. Hist., (6), 20: 211, pl. 6, fig. 2—Flores Island; Pilsbry, 1900, Man. Conch., (2), 13: 205, pl. 65, figs. 17–20; van Benthem Jutting, 1928, Treubia, 10: 158—Sumba(?); Rensch, 1931, Zool. Jahrb., Syst., 61: 101.

Lectotype.—British Museum (Natural History) No. 97.8.3.34.

Distribution.—Flores and Sumba (based on one juvenile shell).

Classification.—*Amphidromus floresianus*.

fruhstorferi Laidlaw, 1954

Amphidromus enganoensis gracilior Fruhstorfer, 1905 (not Fulton, 1896),
Nachr. Malak. Gesell., 37: 200—Pulau Dua, Engano Island.

Amphidromus enganoensis fruhstorferi Laidlaw, 1954, Zool. Meded., 33: 80.

Holotype.—Senckenberg Museum No. 28127a.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus enganoensis fruhstorferi*.

fultoni Ancey, 1897

Amphidromus fultoni Ancey, 1897, Nautilus, 11, (6), 62–63—Cochin China;
Pilsbry, 1900, Man. Conch., (2), 13: 197, pl. 63, figs. 83–84.

Holotype.—Location unknown.

Distribution.—Known only from the type collection.

Classification.—*Amphidromus fultoni*.

fultoni Laidlaw, 1929 (not Ancey, 1897)

Amphidromus fultoni Laidlaw, 1929 (not Ancey, 1897), Proc. Malac. Soc. London, 18: 262—Singgora, Siam.

Amphidromus fultonianus Laidlaw, 1930, Proc. Malac. Soc. London, 19: 16—new name for *fultoni* Laidlaw, 1929 (not Ancey, 1897).

Remarks.—See under *A. fultonianus*.

fultonianus Laidlaw, 1930

Amphidromus fultoni Laidlaw, 1929 (not Ancey, 1897), Proc. Malac. Soc. London, 18: 262—Singgora, Siam.

Amphidromus fultonianus Laidlaw, 1930, Proc. Malac. Soc. London, 19: 16—new name for *fultoni* Laidlaw, 1929 (not Ancey, 1897); van Benthem Jutting, 1960, Basteria, 24: 18—Tebing Tinggi, north of Kangar, Perlis, Malaya.

Holotype.—Probably in the Zoological Survey of India, Calcutta.

Distribution.—Thailand and Malaya.

Classification.—Probably a synonym of *A. flavus*.

furcillatus Mousson, 1849

Bulimus elegans Mousson, 1848 (not Pfeiffer, 1848), Mitt. naturf. Gesell., Zurich, 1: 266—Java; Mousson, 1849, Land. und Süssw. Moll., Java, pp. 110, 115, pl. 3, fig. 3.

Bulimus furcillatus Mousson, 1849, Zeits. Malak., 6: 179-180—new name for *elegans* Mousson, 1848 (not Pfeiffer, 1848); Mousson, 1849, Land. und Süssw. Moll., Java, p. 115; von Martens, 1867, Ostas. Landschn., p. 357, pl. 22, fig. 3.

Amphidromus furcillatus (Mousson), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 76-77; Pilsbry, 1900, Man. Conch., (2), 13: 216-217, pl. 66, figs. 38-40; Schepman, 1912, Proc. Malac. Soc. London, 10: 234; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 232; Oostingh, 1923, Meded. Landb. Hoogesch., 26: 154; van Benthem Jutting, 1929, Treubia, 11: 4; van Benthem Jutting, 1950, Treubia, 20: 493-495, fig. 100.

Amphidromus furcillatus furcillatus (Mousson), Rensch, 1932, Zool. Jahrb., Syst., 63: 98; Rensch, 1934, Trop. Binnengew., 4: 755.

Holotype.—Zoologisch Museum der Universität, Zürich, 90-2-11.

Distribution.—Java (nominate race), Andaman and Nicobar Islands (*andamanicus*).

Classification.—*Amphidromus furcillatus furcillatus*.

fusca von Moellendorff, 1901

Amphidromus metabletus pachychilus form *fusca* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 49—South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 25, fig. 38.

Holotype.—Senckenberg Museum No. 122356.

Distribution.—South Annam.

Classification.—A color phase of *Amphidromus metabletus pachychilus*.

fuscolabris von Moellendorff, 1898

Amphidromus zebrinus fuscolabris von Moellendorff, 1898, Nachr. Malak. Gesell., 30: 75—West Annam; Zilch, 1953, Arch. f. Mollusk., 82: 134, pl. 23, fig. 22.

Holotype.—Senckenberg Museum No. 7641.

Distribution.—West Annam.

Classification.—A synonym of *Amphidromus zebrinus* var. *eudeli*.

givenchyi Geret, 1912

Amphidromus givenchyi Geret, 1912, Jour. de Conch., 60: 55-56, pl. 2, figs. 21-22—type locality unknown.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Unknown, but probably Cambodia.

Classification.—Probably a synonym of *Amphidromus schomburgki*.

glaucolarynx Dohrn, 1861

Bulimus glaucolarynx Dohrn, 1861, Proc. Zool. Soc. London, 1861: 207, pl. 26, fig. 7—Siam.

Bulimus schomburgki var. *fasciata* von Martens, 1867, Ostas. Landschn., p. 80, pl. 21, figs. 1a-1b—Petschaburi, Siam.

Amphidromus glaucolarynx (Dohrn), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 90; Pilsbry, 1900, Man. Conch., (2), 13: 180-182, pl. 60, fig. 49; Haas, 1952, Nat. Hist. Bull. Siam Soc., 15: 24—Wang Pratart Farm, Klang Klung River, Kam Peng Pet Province, Siam; Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, figs. 2-3.

Lectotype.—British Museum (Natural History) No. 19601454.

Distribution.—Thailand.

Classification.—*Amphidromus glaucolarynx*.

globosus Collinge, 1902

Amphidromus perakensis var. *globosus* Collinge, 1902, Fasc. Malay., Zool., 2: 211-212—Biserat, Jalon, North Malaya.

Holotype.—Apparently not designated and the location of the material is unknown.

Distribution.—Known only from the type collection.

Classification.—A variety of *Amphidromus perakensis*.

gloriosa Fulton, 1896

Amphidromus columellaris var. *gloriosa* "Boettger," Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 79—Sierah Island, Tenimber Islands; Pilsbry, 1900, Man. Conch., (2), 13: 214.

Holotype.—Not designated.

Distribution.—Tenimber Islands.

Classification.—A color phase of *Amphidromus columellaris*.

goniostoma Bavay and Dautzenberg, 1908

Amphidromus perversibilis var. *goniostoma* Bavay and Dautzenberg, 1908, Jour. de Conch., 56: 247—Tonkin; Bavay and Dautzenberg, 1909, Jour. de Conch., 57: 280, pl. 10, figs. 7-8.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus dautzenbergi*.

gossi Bartsch, 1904. Figure 35 (p. 580).

Amphidromus gossi Bartsch, 1904, Smith. Misc. Coll., 47: 292-293, pl. 46—Mount Kinabalu, 13,000 feet elevation, North Borneo.

Holotype.—United States National Museum No. 177911.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus pictus*.

Remarks.—The summit of Mount Kinabalu is only 13,500 feet and is devoid of vegetation high enough for *Amphidromus* to live on. Probably *gossi* is found at a much lower elevation.

gracilior Fulton, 1896

Bulimus maculiferus var., Pfeiffer, 1853, Monog. Helic. Viv., 3: 319.

Amphidromus maculiferus var. *gracilior* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 74-75—Mindanao, Philippine Islands.

Amphidromus nigrofilosus Hidalgo, 1891, Mem. Real Acad. Sci., Madrid, 14: pl. 101, figs. 1-4.

Amphidromus maculiferus gracilior (Fulton), Pilsbry, 1900, Man. Conch., (2), 13: 132, pl. 49, fig. 22; Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 15-16, pl. 7, figs. 5-6.

Holotype.—Location unknown.

Distribution.—Northeast Mindanao, Philippine Islands.

Classification.—A form of *Amphidromus maculiferus multicolor*.

gracilior Fruhstorfer, 1905 (not Fulton, 1896)

Amphidromus enganoensis (small form), Pilsbry, 1900, Man. Conch., (2), 13: 158, pl. 61, fig. 56—Pulau Dua Island.

Amphidromus enganoensis gracilior Fruhstorfer, 1905 (not Fulton, 1896), Nachr. Malak. Gesell., 37: 200—Pulau Dua Island, Engano Island; van Benthem Jutting, 1937, Treubia, 16: 50; Zilch, 1953, Arch. f. Mollusk., 82: 134, pl. 23, fig. 23.

Amphidromus enganoensis fruhstorferi Laidlaw, 1954, Zool. Meded., 33: 80—new name for *gracilior* Fruhstorfer, 1905 (not Fulton, 1896).

Lectotype.—Senckenberg Museum No. 28127a.

Distribution.—Pulau Dua Island, Engano Island, Sumatra.

Classification.—*Amphidromus enganoensis fruhstorferi*.

gracilis Fulton, 1896

Amphidromus sinensis var. *gracilis* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 80, pl. 6, fig. 10—Pegu, Burma; Pilsbry, 1900, Man. Conch., (2), 13: 192, pl. 62, fig. 71; Gude, 1914, Fauna Brit. India, Moll., 2: 184.

Lectotype.—British Museum (Natural History) No. 88.12.4.980.

Distribution.—Known only from the type locality.

Classification.—A slender phase of *Amphidromus sinensis*.

gracilis von Moellendorff, 1898 (not Fulton, 1896)

Amphidromus entobaptus var. *gracilis* von Moellendorff, 1898, Abh. Nat. Gesell., Görlitz, 22: 148 (no description); Pilsbry, 1900, Man. Conch., (2), 13: 145.

Amphidromus entobaptus gracilis "von Moellendorff" Kobelt, 1916, in SEMPER, Reisen im Philippinen, 10: 344, pl. 78, figs. 7-8; Zilch, 1953, Arch. f. Mollusk., 82: 135.

Amphidromus entobaptus linapacensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 30, pl. 16, figs. 1-3—Linapacan Island, Calamianes, Philippine Islands.

Holotype.—Senckenberg Museum No. 7662.

Distribution.—Known only from Linapacan Island, Calamianes, Philippine Islands.

Classification.—A form of *Amphidromus entobaptus*.

Remarks.—Under current rules of zoological nomenclature, varietal names have no legal status until "promoted" to subspecific rank, and then they date from that author and publication. Thus, *gracilis* Fulton, 1896, has no official status, and *gracilis* von Moellendorff, 1898, only acquired status as of *gracilis* Kobelt, 1916.

gracilis von Martens, 1899 (not Fulton, 1896)

Amphidromus inconstans var. a, Fulton, 1898, Proc. Malac. Soc. London, 3: 10, 213—Alor Island, Malayan Archipelago.

Amphidromus inconstans var. *gracilis* von Martens, 1899, Arch. Naturg., 65: 29, pl. 3, fig. 2—Alor Island; Pilsbry, 1900, Man. Conch., (2), 13: 210, pl. 67, figs. 16-17.

Holotype.—Zoological Museum, Berlin.

Distribution.—Alor Island.

Classification.—A form of *Amphidromus inconstans inconstans*.

gracilis Rolle, 1903 (not Fulton, 1896)

Amphidromus inconstans var. *gracilis* Rolle, 1903, Nachr. Malak. Gesell., 35: 157—Roma Island, Alor Group.

Amphidromus (Syndromus) inconstans gracilis "Rolle," Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, figs. 6-8.

Lectotype.—Senckenberg Museum No. 7568a.

Distribution.—Known only from the type locality.

Classification.—A subspecies of *Amphidromus inconstans* here renamed *rollei*, since *gracilis* Zilch, 1953, is preoccupied by *gracilis* Kobelt, 1916.

gracillimus Kobelt, 1916

Amphidromus maculiferus var. *gracillimus* Kobelt, 1916, in SEMPER, Reisen im Philippinen, 10: 346, pl. 79, figs. 9-10—Samal Island near Davao, Mindanao, Philippine Islands.

Amphidromus maculiferus gracillimus "Kobelt," Zilch, 1953, Arch. f. Mollusk., 82: 136.

Holotype.—Senckenberg Museum No. 7536.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus maculiferus multicolor*.

haematostoma von Moellendorff, 1898

Amphidromus haematostoma von Moellendorff, 1898, Nachr. Malak. Gesell., 30: 74—east bank of Mekong River, Boloven Plateau, Annam; Pilsbry, 1900, Man. Conch., (2), 13: 182-183; von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 50.

Amphidromus (Syndromus) haematostomus von Moellendorff, Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, figs. 4-5.

Lectotype.—Senckenberg Museum No. 7559.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus haematostomus*.

hamatus Fulton, 1896

Bulimus adamsi forma E, Issel, 1874, Ann. Mus. Civ. Stor. Nat. Genova, 6: 49, pl. 5, figs. 28-29—Labuan, Borneo.

Amphidromus hamatus Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 84, pl. 5, fig. 13—Labuan Island, Borneo.

Amphidromus adamsi hamatus Fulton, Pilsbry, 1900, Man. Conch., (2), 13: 224-225, pl. 70, figs. 51-60; Rensch, 1934, Arch. f. Mollusk., 66: 335.

Holotype.—British Museum (Natural History) No. 96.6.13.30.

Distribution.—Labuan, Niah Hills (Sarawak), and possibly Sintang, West Borneo.

Classification.—*Amphidromus adamsii hamatus*.

hanieli Rensch, 1931

Amphidromus contrarius hanieli Rensch, 1931, Zool. Jahrb., Syst., 60: 450-451—Tjamplong, West Timor; Rensch, 1935, Sitz.-Ber. Gesell. Naturf. Freunde, Berlin, 1935: 334.

Holotype.—Zoologisch Staatssammlung, Munich.

Distribution.—Western Timor.

Classification.—*Amphidromus contrarius hanieli*.

Remarks.—A few of the over 100 specimens in the type series were figured by Haniel (1921, pl. 2, "Lili" figs. 1-38). Rensch (loc. cit.) considered some fourteen specimens collected by Haniel in Tjamplong as hybrids between this race and *Amphidromus reflexilabris*.

hanielianus Rensch, 1931

Amphidromus reflexilabris hanielianus Rensch, 1931, Zool. Jahrb., Syst., **60**: 448-449—Ofu, southwest Timor; Rensch, 1935, Sitz.-Ber. Gesell. Naturf. Freunde, Berlin, **1935**: 334.

Holotype.—Zoologisch Staatssammlung, Munich.

Distribution.—Southwest Timor.

Classification.—*Amphidromus reflexilabris hanielianus*.

Remarks.—Haniel (1921, pls. 1, 2) figured in color some of the 300 specimens he collected.

heerianus Pfeiffer, 1871

Bulimus heerianus Pfeiffer, 1871, Nov. Conch., **4**, (39), pl. 116, fig. 1—Java.

Amphidromus heerianus (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 73; Pilsbry, 1900, Man. Conch., (2), **13**: 138-139, pl. 48, figs. 10-12; Gude, 1903, Jour. Malac., **10**: 55; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, **31**: 232; van Benthem Jutting, 1929, Treubia, **11**: 4; Adam and Leloup, 1939, Mem. Mus. Roy. Nat. Hist. Belgique, hors ser., **2**, (20), p. 32; van Benthem Jutting, 1950, Treubia, **20**: 483-485, fig. 94.

Holotype.—Location unknown.

Distribution.—Java and Meeuwen Island.

Classification.—*Amphidromus heerianus*.

hemicyclus Rochebrune, 1882. Figure 27 (p. 572).

Amphidromus hemicyclus Rochebrune, 1882, Bull. Soc. Phil., **6**: 117—Bangkok, Siam (?error); Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 91; Pilsbry, 1900, Man. Conch., (2), **13**: 193.

Holotype.—Musée National d'Histoire Naturelle, Paris.

Distribution.—Unknown.

Classification.—Probably a synonym of *Amphidromus laevis*.

Remarks.—The type photographs furnished by Dr. Gaillard show a shell very similar to *A. laevis*. It certainly is related to no known mainland species and probably is a mislabeled form of *A. laevis* from Indonesia.

hidalgoi Bartsch, 1917

Amphidromus hidalgovi Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 23, pl. 11, figs. 4, 6—Dapitan, Mindanao, Philippine Islands.

Holotype.—Probably in Madrid.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus maculiferus buluanensis*.

higginsi Bartsch, 1918

Amphidromus versicolor higginsi Bartsch, 1918, Jour. Washington Acad. Sci., 8: 364–367—Vancalan Island, Palawan Passage, Philippine Islands.

Holotype.—United States National Museum No. 218420.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi quadrasi* var. *versicolor*.

hosei Smith, 1895

Amphidromus hosei Smith, 1895, Proc. Zool. Soc. London, 1895: 115, pl. 3, fig. 20—Meri, Sarawak; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 81; Pilsbry, 1900, Man. Conch., (2), 13: 220, pl. 63, fig. 89.

Holotype.—British Museum (Natural History) No. 94.9.3.13.

Distribution.—Known only from the holotype.

Classification.—*Amphidromus adamsii hosei*.

ignea von Moellendorff, 1901

Amphidromus rhodostylus var. *ignea* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 15.

Holotype.—Senckenberg Museum No. 122339.

Distribution.—Known only from the original collection.

Classification.—A variety of *Amphidromus rhodostylus*.

ilsa Rensch, 1933

Amphidromus semifrenatus von Martens (part), Vernhout, 1913, Notes Leiden Mus., 35: 154–155, fig. 3.

Amphidromus ilsa Rensch, 1933, Zool. Anz., 102: 206, fig. 11—woods at Sabang, Pulau Weh, Sumatra; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 183.

Holotype.—Zoologisch Museum, Berlin.

Distribution.—Pulau Weh, and Atchin, North Sumatra.

Classification.—*Amphidromus ilsa*.

inauris Fulton, 1896

Amphidromus winteri var. *inauris* Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 74, pl. 6, figs. 12, 12a—Java; Gude, 1903, Jour. Malac., **10**: 53; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, **31**: 234; van Benthem Jutting, 1950, Treubia, **20**: 486.

Amphidromus winteri inauris "Fulton," Pilsbry, 1900, Man. Conch., (2), **13**: 138, pl. 48, figs. 16–18.

Lectotype.—British Museum (Natural History) No. 96.6.13.13.

Distribution.—West Java.

Classification.—Probably only a variation of *Amphidromus winteri*.

inconstans Fulton, 1898

Amphidromus inconstans Fulton, 1898, Proc. Malac. Soc. London, **3**: 10, 213, fig.—Ombai, Alor Island; Pilsbry, 1900, Man. Conch., (2), **13**: 209–210, pl. 67, figs. 12–17.

Amphidromus oscitans von Martens, 1899, Arch. Naturg., **65**: 29, pl. 3, figs. 3–4; Pilsbry, 1900, Man. Conch., (2), **13**: 204, pl. 67, figs. 1–3.

Holotype.—British Museum (Natural History) No. 98.7.5.129.

Distribution.—Pantar and Alor Islands.

Classification.—*Amphidromus inconstans inconstans*.

indistinctus Pilsbry, 1900

Amphidromus sinensis var. *indistinctus* Pilsbry, 1900, Man. Conch., (2), **13**: 192, pl. 62, fig. 70—mountains of Laos.

Holotype.—Academy of Natural Sciences, Philadelphia No. 31486.

Distribution.—Known only from the type collection.

Classification.—A variety of *Amphidromus sinensis*.

inflatus Fulton, 1896

Amphidromus maculiferus var. *inflata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 75—Baranda, Philippine Islands.

Amphidromus maculiferus inflatus Pilsbry, 1900, Man. Conch., (2), **13**: 133, pl. 49, figs. 25–27.

Amphidromus inflatus Bartsch, 1917, U. S. Nat. Mus., Bull. 100, **1**, pt. 1, pp. 21–22, pl. 1, fig. 3, pl. 10, figs. 6–7.

Holotype.—Location unknown.

Distribution.—Basilan, Bilitan, and the southwest peninsula of Mindanao.

Classification.—A form of *Amphidromus maculiferus*.

infrapictus von Martens, 1867

Bulimus interruptus var. *infrapictus* von Martens, 1867, Ostas. Landschn., p. 344, pl. 20, figs. 1, 9—Bali.

Amphidromus perversus var. *infrapicta* von Martens, Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 68; Pilsbry, 1900, Man. Conch., (2), 13: 152, pl. 52, figs. 55-56; van Benthem Jutting, 1941, Arch. Neerland. Zool., 5: 317.

Holotype.—Zoologisch Museum der Universität, Zurich 90-1-7.

Distribution.—South Celebes, Bali, Bawean Islands, Kangean Island, Madura and Java.

Classification.—A color phase of *Amphidromus perversus*.

infraviridis von Martens, 1867

Bulimus interruptus var. *infraviridis* von Martens, 1867, Ostas. Landschn., pp. 344-345, pl. 20, figs. 2, 5, 8—Maros, South Celebes.

Amphidromus perversus var. *infraviridis* (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 152; van Benthem Jutting, 1941, Arch. Neerland. Zool., 5: 317.

Holotype.—Location unknown.

Distribution.—Celebes, Java, Bawean Islands.

Classification.—A color phase of *Amphidromus perversus*.

ingens von Moellendorff, 1900

Amphidromus ingens von Moellendorff, 1900, Nachr. Malak. Gesell., 32: 23-24—Mother and Child Mountain, Annam; Pilsbry, 1900, Man. Conch., (2), 13: 175-176; Zilch, 1953, Arch. f. Mollusk., 82: 135, pl. 23, fig. 25.

Lectotype.—Senckenberg Museum No. 7565.

Distribution.—Known only from the type material.

Classification.—Possibly *A. placostylus* is a synonym, but we tentatively considered both to be valid species.

inornata Fulton, 1896

Amphidromus adamsi var. *inornata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 83, pl. 5, fig. 6—North Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 223, pl. 69, fig. 45.

Lectotype.—British Museum (Natural History) No. 96.6.13.12.

Distribution.—Known from the type collection only.

Classification.—A color phase of *Amphidromus adamsii*.

insularis von Moellendorff, 1901

Amphidromus metabletus insularis von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 49-50—Bain-Min Island, Annam; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 24, fig. 31.

Holotype.—Senckenberg Museum No. 7585.

Distribution.—Known only from the type locality.

Classification.—An insular variation of *Amphidromus metabletus* too weakly distinguished to merit subspecific status.

interrupta von Moellendorff, 1901 (see p. 528)

interruptus Müller, 1774

Helix interrupta Müller, 1774, Hist. Verm. terr. fluv., 2: 94—locality not given; Pfeiffer, 1849, Zeits. Malak., 6: 131.

Bulimus interruptus (Müller), Mousson, 1849, Land. und Süssw. Moll. Java, pp. 30–31, pl. 4, figs. 1–2, pl. 20, fig. 4; Pfeiffer, 1849, Zeits. Malak., 6: 131.

Amphidromus interruptus (Müller), Semper, 1874, Reisen im Philippinen, 3: 147 (anatomy); Pilsbry, 1900, Man. Conch., (2), 13: 150–153, pl. 52, figs. 53–56; Gude, 1903, Jour. Malac., 10: 55; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 232; Rensch, 1931, Zool. Jahrb., Syst., 61: 101; Paravicini, 1935, Arch. f. Mollusk., 67: 173.

Amphidromus perversus var. *interrupta* (Müller), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 68.

Amphidromus perversus interruptus (Müller), P. and F. Sarasin, 1899, Land-Moll. Celebes, pp. 208–209; van Benthem Jutting, 1950, Treubia, 20: 489–491.

Holotype.—Zoological Museum, Copenhagen.

Distribution.—Same as in typical *aversus*.

Classification.—A color phase of *Amphidromus perversus*.

aversus Müller, 1774

Helix inversus Müller, 1774, Hist. Verm. terr. fluv., 2: 93–94—locality not given; Chemnitz, 1850, Syst. Conch. Cab., I, 13, (1), p. 11, pl. 6, figs. 1–3.

Bulimus jayanus Lea, 1841, Proc. Amer. Phil. Soc., 2: 31—Java(?).

Bulimus contusus Reeve, 1848, Conch. Icon., *Bulimus*, pl. 37, fig. 220—eastern islands.

Bulimus elongatus Hombron and Jacquinot, 1852, Voy. au Pol. Sud., Moll., pl. 8, figs. 3–4—Sumatra.

Amphidromus inversus (Müller), Morlet, 1884, Jour. de Conch., 37: 127; Crosse, 1894, Jour. de Conch., 42: 171; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 70; Pilsbry, 1900, Man. Conch., (2), 13: 167–170, pl. 56, figs. 91–92; Gude, 1903, Jour. Malac., 10: 56; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 213; van Benthem Jutting, 1925, Treubia, 6: 142; Paravicini, 1935, Arch. f. Mollusk., 67: 173; van Benthem Jutting, 1941, Arch. Neerland. Zool., 5: 314–315; Dammerman, 1948, Verh. Akad. Wett. Amst., 44, “Fauna of Krakatau,” p. 514, pl. 11; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 163—localities in Sumatra.

Holotype.—Zoological Museum, Copenhagen.

Distribution.—From Annam through Malaya to Sumatra, Borneo, and Celebes. Absent from Java (although found on small islands in the Java Sea), the Mentawi Islands, and Panaitan.

Classification.—*Amphidromus inversus*.

jacobsoni Laidlaw, 1954

Amphidromus sumatranus forma *jacobsoni* Laidlaw, 1954, Zool. Meded., 33: 80–81, fig. 2—Simalur Island, west Sumatra.

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden, No. “*Amphidromus* 47'a.”

Distribution.—Known only from the type locality.

Classification.—Either a variety or a weakly differentiated subspecies of *Amphidromus sumatranus*.

jaeckeli Laidlaw, 1954

Amphidromus contrarius floresi Haltenorth and Jaeckel, 1940 (not Bartsch, 1917), Arch. f. Mollusk., 72: 174–175, figs. 3, 4—Kampong Mosena, West Flores.

Amphidromus contrarius jaeckeli Laidlaw, in BUTOT, 1954, Penggemar Alam, 34: 106–107, figs. 2, 3—Komodo Island.

Holotype.—Zoological Museum, Berlin.

Distribution.—West Flores and Komodo Island.

Classification.—*Amphidromus poecilochrous jaeckeli*.

janus Pfeiffer, 1854

Bulimus janus Pfeiffer, 1854, Proc. Zool. Soc. London, 1852: 85—New Hebrides (error); Pfeiffer, 1854, Syst. Conch. Cab., 1, 13, (1), pp. 156–157, pl. 48, figs. 1–4.

Amphidromus janus (Pfeiffer), Crosse, 1894, Jour. de Conch., 42: 172; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 70–71; Pilsbry, 1900, Man. Conch., (2), 13: 156–157, pl. 58, figs. 14–18; Gude, 1914, Fauna Brit. India, Moll., 2: 178–179.

Lectotype.—British Museum (Natural History) No. 19601444.

Distribution.—Tavoy, Lower Burma, and Mergui Archipelago.

Classification.—*Amphidromus janus*.

javanicus Sowerby, 1841

Bulimus javanicus Sowerby, 1841, Conch. Illust., pl. 6, fig. 35—Java; Pfeiffer, 1849, Zeits. Malak., 6: 131.

Bulimus loricatus Pfeiffer, 1855, Proc. Zool. Soc. London, 1854: 293—locality unknown; von Martens, 1867, Ostas. Landschn., p. 339, pl. 22, fig. 2.

Amphidromus javanicus (Sowerby), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 73; Pilsbry, 1900, Man. Conch., (2), 13: 140, pl. 61, figs. 50-51; Gude, 1903, Jour. Malac., 10: 55; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 233; Paravicini, 1935, Arch. f. Mollusk., 67: 173; van Benthem Jutting, 1950, Treubia, 20: 486-487, fig. 96.

Holotype.—Location unknown.

Distribution.—West Java.

Classification.—*Amphidromus javanicus*.

jayanus Lea, 1841

Bulimus jayanus Lea, 1841, Proc. Amer. Phil. Soc., 2: 31—Java(?).

Holotype.—United States National Museum No. 105039.

Classification.—A synonym of *Amphidromus inversus*.

jucundus Fulton, 1896

Amphidromus filozonatus var. *jucunda* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 78, pl. 7, fig. 8—Macassar, Celebes.

Amphidromus jucundus Fulton, von Moellendorff, 1896, Nachr. Malak. Gesell., 28: 146; P. and F. Sarasin, 1899, Land-Moll. Celebes, p. 214; Pilsbry, 1900, Man. Conch., (2), 13: 203, pl. 64, fig. 8; Bollinger, 1918, Rev. Suisse Zool., 26: 332.

Amphidromus contrarius maculatus Fulton, Rensch, 1932, Zool. Jahrb., Syst., 63: 96.

Lectotype.—British Museum (Natural History) No. 57.7.18.2.

Distribution.—Celebes.

Classification.—A synonym of *Amphidromus maculatus*.

junghuhni von Martens, 1867

Bulimus junghuhni von Martens, 1867, Ostas. Landschn., p. 354 (*nomen nudum*).

kalaoensis Fulton, 1896

Amphidromus kalaoensis Fulton, 1896, Ann. Mag. Nat. Hist., (6), 18: 102—Kalao Island; Smith, 1896, Ann. Mag. Nat. Hist., (6), 18: 148, pl. 10, fig. 10 (lectotype); Pilsbry, 1900, Man. Conch., (2), 13: 204-205, pl. 67, figs. 4, 11.

Amphidromus contrarius kalaoensis Fulton, Rensch, 1932, Zool. Jahrb., Syst., 63: 96.

Holotype.—British Museum (Natural History) No. 96.5.16.153.

Distribution.—Kalao Island, Saleyer Bay, south Celebes.

Classification.—Probably a subspecies of *Amphidromus maculatus* although possibly a distinct species.

kissuensis Rolle, 1903

Amphidromus laevis var. *kissuensis* Rolle, 1903, Nachr. Malak. Gesell., 35: 157—Kissu Island, northeast of Timor.

Amphidromus laevis var. *kissuensis* Rolle, Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, fig. 10.

Holotype.—Senckenberg Museum No. 7572a.

Distribution.—Known only from the type locality.

Classification.—A variety or weakly characterized subspecies of *Amphidromus laevis*.

kobelti Rolle, 1893

Amphidromus kobelti Rolle, 1893, Nachr. Malak. Gesell., 25: 34—locality unknown.

Holotype.—Location unknown.

Classification.—A synonym of *Amphidromus laevis* (see Fulton, 1896, p. 76).

kobelti von Moellendorff, 1902 (not Rolle, 1893)

Amphidromus kobelti von Moellendorff, 1902 (not Rolle, 1893), Nachr. Malak. Gesell., 34: 157—Indochina.

Amphidromus moellendorffi Haas, 1934, Senckenbergiana, 16: 96, fig. 13—new name for *kobelti* von Moellendorff; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 25, fig. 43.

Lectotype.—Senckenberg Museum No. 7683.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus schomburgki*.

koperbergi, new subspecies (see p. 561). Figure 24 (p. 562).

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden No. “*Amphidromus* 16'a.”

Distribution.—Known only from the type collection.

Classification.—*Amphidromus inversus koperbergi*.

kruijti P. and F. Sarasin, 1899. Figure 29, B (p. 574).

Amphidromus kruijti P. and F. Sarasin, 1899, Land-Moll. Celebes, p. 213, pl. 26, figs. 263, 263a, 264 (shell), pl. 31, fig. 304 (radula)—Karoa, Celebes; Pilsbry, 1900, Man. Conch., (2), 13: 233–234, pl. 68, figs. 18–20.

Lectotype.—Naturhistorisches Museum Basel No. 2292-b (specimen figured by Sarasin, op. cit., fig. 264).

Distribution.—Central and northern Celebes.

Classification.—*Amphidromus kruijti*.

kuehni von Moellendorff, 1902

Amphidromus kuehni von Moellendorff, 1902, *Nachr. Malak. Gesell.*, 34: 205-206—Kaledupa, Tukang Besi Island, southeast of Celebes; Zilch, 1953, *Arch. f. Mollusk.*, 82: 132, pl. 22, fig. 9.

Amphidromus contrarius kuehni von Moellendorff, Rensch, 1932, *Zool. Jahrb., Syst.*, 63: 96.

Lectotype.—Senckenberg Museum No. 122335.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus kuehni*.

laevis "Müller" Pilsbry, 1900

Amphidromus laevis "Müller" Pilsbry, 1900, *Man. Conch.*, (2), 13: 214-216.

Remarks.—An unnecessary emendation of *Helix laeva* Müller, 1774.

laevus Müller, 1774

Helix laeva Müller, 1774, *Hist. Verm. terr. fluv.*, 2: 95-96—Moluccas; Chemnitz, 1850, *Syst. Conch. Cab.*, I, 13, (1), p. 15, pl. 9, figs. 7-15.

Amphidromus laevis (Müller), von Martens, 1877, *Monatsber. K. P. Akad.*, Berlin, 1877: 279; Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), 17: 76; Pilsbry, 1901, *Man. Conch.*, (2), 14: 167 (correction of spelling); Rolle, 1903, *Nachr. Malak. Gesell.*, 35: 157; van Benthem Jutting, 1953, *Treubia*, 22: 318.

Amphidromus laevis "Müller" Pilsbry, 1900, *Man. Conch.*, (2), 13: 214-216, pl. 66, figs. 49-54; Rensch, 1935, *Sitz.-Ber. Gesell. Naturf. Freunde*, Berlin, 1935: 313.

Holotype.—Zoological Museum, Copenhagen.

Distribution.—Uncertain (see p. 572).

Classification.—*Amphidromus laevis*.

laosianus Bavay, 1898

Amphidromus laosianus Bavay, 1898, *Jour. de Conch.*, 46: 15, pl. 2, figs. 1, 1a—upper Mekong Valley, Indochina; Pilsbry, 1900, *Man. Conch.*, (2), 13: 183-184, pl. 62, figs. 60-63.

Holotype.—Location unknown.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus laosianus*.

latestrigatus Schepman, 1892. Figure 25 (p. 568).

Amphidromus latestrigatus Schepman, 1892, *Notes Leyden Museum*, 14: 151-152—Sumba; Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), 17: 89, pl. 7,

fig. 1; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 207-208, pl. 67, fig. 10; Pilsbry, 1901, *Man. Conch.*, (2), **14**: 167, pl. 49, figs. 5-6; van Benthem Jutting, 1928, *Treubia*, **10**: 158; Rensch, 1932, *Zool. Jahrb., Syst.*, **63**: 99-100, figs. 37-38.

Amphidromus sumbaensis Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **18**: 102—Sumba; Fulton, 1897, *op. cit.*, (6), **20**: 214, pl. 6, fig. 1; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 208, pl. 67, figs. 5-8; van Benthem Jutting, 1928, *Treubia*, **10**: 159.

Amphidromus consobrinus Fulton, 1897, *Ann. Mag. Nat. Hist.*, (6), **20**: 211, pl. 6, fig. 3—Flores Island, Sumba Island; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 208-209, pl. 67, fig. 9; van Benthem Jutting, 1928, *Treubia*, **10**: 159.

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden, No. “*Amphidromus* 38'a.”

Distribution.—Flores, Sumba and (?) Bali (two specimens in Berlin Museum).

Classification.—*Amphidromus latestrigatus*.

ledyardi Bartsch, 1918

Amphidromus quadrasi ledyardi Bartsch, 1918, *Jour. Washington Acad. Sci.*, **2**: 302—Bekin Island, Palawan Passage.

Holotype.—United States National Museum No. 215606.

Distribution.—Known only from the type collection.

Classification.—A synonym of *Amphidromus quadrasi quadrasi*.

lepidus Gould, 1856

Bulimus lepidus Gould, 1856, *Proc. Boston Soc. Nat. Hist.*, **6**: 12—Mergui Archipelago; Hanley and Theobald, 1876, *Conch. Indica*, pl. 80, fig. 6.

Amphidromus sylheticus (Reeve), Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 79-80.

Amphidromus lepidus (Gould), Pilsbry, 1900, *Man. Conch.*, (2), **13**: 190, pl. 63, fig. 99; Gude, 1914, *Fauna Brit. India, Moll.*, **2**: 181-182.

Holotype.—Location unknown.

Distribution.—Mergui Archipelago.

Classification.—*Amphidromus sylheticus lepidus*.

leucoxanthus von Martens, 1864

Bulimus leucoxanthus von Martens, 1864, *Monatsber. Berlin Akad.*, 1864: 526—Siam; von Martens, 1867, *Ostas. Landschn.*, pp. 348-349, pl. 20, figs. 11-12; Morlet, 1889, *Jour. de Conch.*, **37**: 127.

Amphidromus perversus var. *leucoxanthus* (von Martens), Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 69.

Amphidromus aureus leucoxanthus (von Martens), Pilsbry, 1900, Man. Conch., (2), **13**: 163-164, pl. 54, figs. 73-79.

Holotype.—Location unknown.

Distribution.—Thailand.

Classification.—*Amphidromus atricallosus* form *leucoxanthus*.

lilacina Bavay and Dautzenberg, 1909

Amphidromus perversibilis var. *lilacina* Bavay and Dautzenberg, 1909, Jour. de Conch., **57**: 281, pl. 9, figs. 6-7—locality not given.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Tonkin.

Classification.—A color form of *Amphidromus dautzenbergi*.

linapacensis Bartsch, 1917

Amphidromus entobaptus gracilis Kobelt, 1916, in SEMPER, Reisen im Philipinen, **10**: 344, pl. 78, figs. 7-8—Linapac and Busuanga, Calamianes, Philippines.

Amphidromus entobaptus linapacensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, **1**, pt. 1, p. 30, pl. 16, figs. 1-3—Linapac, Calamianes, Philippine Islands.

Holotype.—United States National Museum No. 215599 (*linapacensis*).

Distribution.—Known only from the type locality.

Classification.—This form is a synonym of *Amphidromus entobaptus contractus*.

lindstedti Pfeiffer, 1857

Bulimus lindstedti Pfeiffer, 1857, Proc. Zool. Soc. London, **1856**: 388—Malacca (error?).

Amphidromus lindstedti (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 85, pl. 5, figs. 15, 15a; Pilsbry, 1900, Man. Conch., (2), **13**: 228-229, pl. 70, figs. 70-71.

Lectotype.—British Museum (Natural History) No. 19601448.

Distribution.—Possibly Balabac, Philippine Islands.

Classification.—Incertae sedis.

Remarks.—No similar shell is known from Malaya, and probably *A. lindstedti* was based on a mislabeled shell of the *versicolor-quadrasi* complex from the Philippines. The name *lindstedti* has priority over both *versicolor* and *quadrasi*. While it might be possible to prove that the type of *lindstedti* is the same as some named Philippine form, the

resulting nomenclatural complexities would cause great confusion and we prefer to leave *lindstedti* as a dubious species.

loricatus Pfeiffer, 1855

Bulimus loricatus Pfeiffer, 1855, Proc. Zool. Soc. London, 1854: 293—locality unknown.

Lectotype.—British Museum (Natural History) No. 19601446.

Classification.—A synonym of *Amphidromus javanicus* (Sowerby) (see Fulton, 1896, p. 73).

lutea Fulton, 1896

Amphidromus sinistralis var. *lutea* "von Martens" Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 76—Moluccas; Pilsbry, 1900, Man. Conch., (2), 13: 232-233.

Holotype.—Location unknown.

Distribution.—Celebes.

Classification.—A color phase of *Amphidromus sinistralis*.

Remarks.—The reference to von Martens (1867, pp. 355-356) quoted by Fulton (loc. cit.) was a first word in a descriptive phrase and has no nomenclatural validity.

luteofasciata Fulton, 1896

Amphidromus adamsi var. *luteofasciata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 82, pl. 5, figs. 2, 2a—Banguey Island, Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 223, pl. 69, figs. 39-40.

Lectotype.—British Museum (Natural History) No. 96.6.13.47.

Distribution.—Banguey Island.

Classification.—A color phase of *Amphidromus adamsii*.

maculatus Fulton, 1896

Amphidromus contrarius var. *maculata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 78, pl. 7, fig. 4—Macassar, Celebes; P. and F. Sarasin, 1899, Land-Moll. Celebes, p. 221, pl. 26, figs. 259-260; Fruhstorfer, 1905, Nachr. Malak. Gesell., 37: 199.

Amphidromus maculatus Fulton, 1896, Ann. Mag. Nat. Hist., (6), 18: 102.

Amphidromus kalaoensis Fulton, 1896, Ann. Mag. Nat. Hist., (6), 18: 102—Kalao Island, Saleyer Bay, south Celebes; Smith, 1896, op. cit., (6), 18: 148, pl. 10, fig. 10.

Amphidromus maculatus (Fulton), Pilsbry, 1900, Man. Conch., (2), 13: 202-203, pl. 64, figs. 9-11.

Amphidromus contrarius maculatus (Fulton), Rensch, 1932, Zool. Jahrb., Syst., 63: 96; Zilch, 1953, Arch. f. Mollusk., 82: 131.

Lectotype.—British Museum (Natural History) No. 19601456.

Distribution.—South Celebes and Kalao Island.

Classification.—*Amphidromus maculatus maculatus*.

maculiferus Sowerby, 1838

Bulimus maculiferus Sowerby, 1838, Conch. Illust., pl. 145, fig. 100—Mindanao; Reeve, 1849, Conch. Icon., *Bulimus*, pl. 6, fig. 26 a, b; Pfeiffer, 1849, Zeits. Malak., 6: 134–135.

Amphidromus maculiferus (Sowerby), Semper, 1874, Reisen im Philippinen, 3: 146, pl. 14, fig. 11 (anatomy); Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 74–75 (with var. *obscura*); Pilsbry, 1900, Man. Conch., (2), 13: 130–133, pl. 49, figs. 19–21 (with var. *obscura*); Kobelt, 1916, in SEMPER, Reisen im Philippinen, 10: 345–347, pl. 79, figs. 1–10, pl. 8, figs. 1–4.

Amphidromus maculiferus maculiferus (Sowerby), Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 10–11, pl. 2, figs. 1–5; Zilch, 1953, Arch. f. Mollusk., 82: 135.

Holotype.—Location unknown.

Distribution.—The species is found on Basilan, Mindanao, Samar, Bohol, Leyte, and possibly Cebu, Philippine Islands.

Classification.—*Amphidromus maculiferus maculiferus*.

makassariensis Hombron and Jacquinot, 1852

Bulimus makassariensis Hombron and Jacquinot, 1852, Voy. au Pol. Sud., Moll., pl. 8, figs. 5–6—Macassar, Celebes.

Holotype.—Musée National d'Histoire Naturelle, Paris.

Classification.—A synonym of *Amphidromus perversus* (see Fulton, 1896, p. 68).

malindangensis Bartsch, 1917

Amphidromus maculiferus malindangensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 19, pl. 9, figs. 1–2—Mount Malindang, Mindanao, Philippine Islands.

Holotype.—United States National Museum No. 244689.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus maculiferus maculiferus*.

mangsianus Pilsbry, 1900

Amphidromus adamsi var. *mangsianus* Pilsbry, 1900, Man. Conch., (2), 13: 223, pl. 66, figs. 44–45 (lectotype)—Mangsi Island, Balabac Strait, Philippine Islands.

Lectotype.—Academy of Natural Sciences, Philadelphia No. 28343.

Distribution.—Known only from the type locality.

Classification.—A variety or subspecies of *Amphidromus adamsii*.

martensi Boettger, 1894

Amphidromus martensi Boettger, 1894, Nachr. Malak. Gesell., 26: 66–67—Kinabalu, North Borneo; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 71, pl. 7, fig. 10; Pilsbry, 1900, Man. Conch., (2), 13: 158–159, pl. 61, fig. 52; Haas, 1951, Fieldiana, Zoology, 31, (52), p. 626—Sandakan and Kinabatangan Districts, North Borneo; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 24, fig. 29.

Amphidromus martensi var. *capistratus* von Martens, 1903, Sitz.-Ber. Gesell. Naturf. Freunde, Berlin, 1903: 494, text fig.—Kinabalu, Borneo.

Amphidromus martensi capistratus von Martens, Thiele, 1908, Mitt. Zool. Mus., Berlin, 4: 286–287.

Lectotype.—Senckenberg Museum No. 7645.

Distribution.—Eastern Borneo.

Classification.—*Amphidromus martensi*.

masoni Godwin-Austen, 1876

Bulimus masoni Godwin-Austen, 1876, Jour. Asiatic Soc. Bengal, 45: 316, pl. 6, fig. 2—Dihiri Parbat, Dafla Hills, Assam.

Amphidromus daflensis Nevill, 1878, Hand List Moll. Ind. Mus., 1: 127 (*nomen nudum*).

Amphidromus masoni (Godwin-Austen), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 81, pl. 6, fig. 2; Pilsbry, 1900, Man. Conch., (2), 13: 189–190, pl. 62, fig. 72; Gude, 1914, Fauna Brit. India, Moll., 2: 181.

Holotype.—British Museum (Natural History) No. 1908.03. vii. 1.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus masoni*.

mearnsi Bartsch, 1917

Amphidromus inflatus mearnsi Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 22, pl. 10, figs. 1–2—Atingating, Basilan Island, Philippine Islands.

Holotype.—United States National Museum No. 245565.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus chloris chloris*.

melanomma Pfeiffer, 1852

Bulimus melanomma Pfeiffer, 1852, Zeits. Malak., 9: 95—Moluccas; Pfeiffer, 1852, Syst. Conch. Cab., 1, 13, (1), pp. 135–136, pl. 6, fig. 3, pl. 39, figs. 28–29, pl. 41, figs. 1–2, 7–8.

Amphidromus melanomma (Pfeiffer), de Morgan, 1885, Bull. Soc. Zool. France, **10**: 39; Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 68; Pilsbry, 1900, Man. Conch., (2), **13**: 162-163, pl. 55, figs. 80-86.

Holotype.—Location unknown.

Distribution.—Rhiu Archipelago, Perak, and Singapore.

Classification.—Probably *Amphidromus perversus melanomma*.

metabletus von Moellendorff, 1900

Amphidromus metabletus von Moellendorff, 1900, Nachr. Malak. Gesell., **32**: 22-23—Mother and Child Mountain, South Annam; Pilsbry, 1900, Man. Conch., (2), **13**: 174-175; von Moellendorff, 1901, Nachr. Malak. Gesell., **33**: 48-49; Pilsbry, 1901, Man. Conch., (2), **14**: 168-169, pl. 49, figs. 1-4; Zilch, 1953, Arch. f. Mollusk., **82**: 137, pl. 24, figs. 30-36, pl. 25, figs. 37-38.

Lectotype.—Senckenberg Museum No. 7583.

Distribution.—Bai-Min Island and South Annam.

Classification.—*Amphidromus metabletus metabletus*.

mindoroensis Bartsch, 1917

Amphidromus mindoroensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, **1**, pt. 1, p. 33, pl. 15, figs. 4-5—Mindoro Island, Philippine Islands.

Holotype.—United States National Museum No. 245564.

Distribution.—Known only from the type collection.

Classification.—A form of *Amphidromus entobaptus*.

minor Bavay and Dautzenberg, 1908

Amphidromus perversibilis var. *minor* Bavay and Dautzenberg, 1908, Jour. de Conch., **56**: 247—locality not given; Bavay and Dautzenberg, 1909, op. cit., **57**: 280-281, pl. 10, fig. 6.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Known only from the type locality.

Classification.—A dwarf variation of *Amphidromus dautzenbergi*.

mirandus Bavay and Dautzenberg, 1912

Amphidromus mirandus Bavay and Dautzenberg, 1912, Jour. de Conch., **60**: 17-18, pl. 2, figs. 23-24—Lang-Bian, Annam.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Known only from the type specimens.

Classification.—*Amphidromus mirandus*.

mitra von Martens, 1867

Bulimus mitra von Martens, 1867, Ostas. Landschn., p. 343—Buleling, Bali.

Amphidromus interruptus sultanus var. *mitra* (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 155-156.

Holotype.—Location unknown.

Distribution.—Bali.

Classification.—A variation of *Amphidromus perversus perversus*.

moellendorffi Haas, 1934

Amphidromus kobelti von Moellendorff, 1902 (not Rolle, 1893), Nachr. Malak. Gesell., 34: 157 (nomen nudum).

Amphidromus moellendorffi Haas, 1934, Senckenbergiana, 16: 96, fig. 13—Hinlap, Siam; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 25, fig. 43.

Holotype.—Senckenberg Museum No. 7683.

Distribution.—Known only from the type specimens.

Classification.—A synonym of *Amphidromus schomburgki*.

moniliferus Gould, 1846

Bulimus moniliferus Gould, 1846, Proc. Boston Soc. Nat. Hist., 2: 99—Tavoy, Burma.

Bulimus theobaldianus Benson, 1857, Ann. Mag. Nat. Hist., (2), 19: 329—Burma.

Amphidromus moniliferus (Gould), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 90, pl. 7, fig. 9; Pilsbry, 1900, Man. Conch., (2), 13: 179-180, pl. 62, figs. 73-74; Gude, 1914, Fauna Brit. India, Moll., 2: 180.

Holotype.—Location unknown.

Distribution.—Tavoy, Burma.

Classification.—*Amphidromus moniliferus*.

monozonalis Bavay and Dautzenberg, 1909

Amphidromus perversibilis var. *monozonalis* Bavay and Dautzenberg, 1909, Jour. de Conch., 57: 281, pl. 10, figs. 1-2—Tonkin.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Tonkin.

Classification.—A color phase of *Amphidromus dautzenbergi*.

monticolus Bartsch, 1918

Amphidromus versicolor monticolus Bartsch, 1918, Jour. Washington Acad. Sci., 8: 364—Mount Landargung, South Palawan, Philippine Islands at 2,400 feet elevation.

Holotype.—United States National Museum No. 218240.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi everetti*.

mouhoti Pfeiffer, 1861

Bulimus mouhoti Pfeiffer, 1861, Proc. Zool. Soc. London, 1861: 194—Siam.

Bulimus schomburgki var. *mouhoti* Pfeiffer, von Martens, 1867, Ostas. Land-schn., p. 80—mountains of Cambodia.

Amphidromus mouhoti (Pfeiffer), Fischer, 1891, Soc. d'hist. Nat. d'Autun, 4: 32; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 88; Pilsbry, 1900, Man. Conch., (2), 13: 186, pl. 60, figs. 33–35.

Lectotype.—British Museum (Natural History) No. 19601438.

Distribution.—Thailand and Cambodia.

Classification.—*Amphidromus mouhoti*.

multicolor von Moellendorff, 1893

Amphidromus maculiferus var. *multicolor* von Moellendorff, 1893, Bericht. Sencken. Naturf. Gesell., 24: 99—Leyte, Philippine Islands; Kobelt, 1916, in SEMPER, Reisen im Philippinen, 10: 346, pl. 79, figs. 7–8.

Amphidromus maculiferus multicolor von Moellendorff, Pilsbry, 1900, Man. Conch., (2), 13: 131–132; Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 17, pl. 8, figs. 1, 2, 4, 5; Zilch, 1953, Arch. f. Mollusk., 82: 136, pl. 23, fig. 27.

Lectotype.—Senckenberg Museum No. 7537.

Distribution.—Leyte, Bohol, Camotes Islands, Mindanao, Basilan.

Classification.—*Amphidromus maculiferus multicolor*.

multifasciata Fulton, 1896

Amphidromus contrarius var. *multifasciata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 78, pl. 7, fig. 5—Cambodia; Fruhstorfer, 1905, Nachr. Malak. Gesell., 37: 199.

Amphidromus xiengensis var. *multifasciata* Fulton, Pilsbry, 1900, Man. Conch., (2), 13: 195, pl. 63, fig. 77.

Lectotype.—British Museum (Natural History) No. 19601458.

Distribution.—Cambodia.

Classification.—A color phase of *Amphidromus xiengensis*.

mundus Pfeiffer, 1853. Figure 38 (p. 589).

Bulimus mundus Pfeiffer, 1853, Zeits. Malak., 10: 57—Singapore and Borneo(?).

Amphidromus mundus (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 71; Pilsbry, 1900, Man. Conch., (2), 13: 174, pl. 61, figs. 57–59.

Holotype.—Location unknown.

Distribution.—Unknown.

Classification.—*Incertae sedis*.

natunensis Fulton, 1896. Figure 19 (p. 536).

Amphidromus perversus vars. Smith, 1894, Ann. Mag. Nat. Hist., (6), **13**: 457-458.

Amphidromus perversus var. *natunensis* Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 69—Natuna Islands.

Amphidromus aureus var. *natunensis* Fulton, Pilsbry, 1900, Man. Conch., (2), **13**: 162-163, pl. 55, figs. 87-88.

Lectotype.—British Museum (Natural History) No. 94.2.1.8.

Distribution.—Great Natuna Islands.

Classification.—*Amphidromus perversus natunensis*.

negrosensis Bartsch, 1946

Amphidromus versicolor negrosensis Bartsch, 1946, Nautilus, **60**: 65-66, pl. 6, fig. 2—Bacalod, Negros Island, Philippine Islands.

Holotype.—United States National Museum No. 542921.

Distribution.—Known only from the type specimens.

Classification.—A synonym of *Amphidromus quadrasi quadrasi*.

niasensis Fulton, 1907

Amphidromus niasensis Fulton, 1907, Ann. Mag. Nat. Hist., (7), **19**: 151-152, pl. 9, fig. 9—Nias Island, Sumatra; van Benthem Jutting, 1935, Misc. Zool. Sumatrana, **89**: 3; van Benthem Jutting, 1959, Beaufortia, **7**, (83), p. 186.

Amphidromus contrarius niasensis Fulton, Rensch, 1932, Zool. Jahrb., Syst., **63**: 96.

Lectotype.—British Museum (Natural History) No. 1907.5.3.123.

Distribution.—Nias Island, and possibly Sumatra.

Classification.—A variety or weakly differentiated subspecies of *Amphidromus sumatranaus*.

nicobarica Godwin-Austen, 1895

Amphidromus andamanicus var. *nicobarica* Godwin-Austen, 1895, Proc. Zool. Soc. London, **1895**: 450—Katchall, Nicobar Islands.

Holotype.—Location unknown.

Classification.—A synonym of *Amphidromus furcillatus andamanicus*.

nigrofilosus Rochebrune, 1882

Amphidromus nigrofilosus Rochebrune, 1882, Bull. Soc. Phil., 6: 72—mountains of Chaudoc, Cambodia (error?).

Amphidromus maculiferus var. *gracilior* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 74—Mindanao, Philippine Islands.

Holotype.—Musée National d'Histoire Naturelle, Paris.

Distribution.—Mindanao, Philippine Islands.

Classification.—Probably a synonym of *Amphidromus maculiferus* *multicolor* form *gracilior*.

nigrolineata von Moellendorff, 1901

Amphidromus rhodostylus var. *nigrolineata* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 14.

Holotype.—Senckenberg Museum No. 122338.

Distribution.—Known only from the type collection.

Classification.—A variety of *Amphidromus rhodostylus*.

nikiensis Rensch, 1931

Amphidromus contrarius nikiensis Rensch, 1931, Zool. Jahrb., Syst., 60: 451–452—Ofu, central Timor.

Holotype.—Zoologische Staatssammlung, Munich.

Distribution.—Central Timor.

Classification.—*Amphidromus contrarius nikiensis*.

Remarks.—The material this subspecies is based on is also discussed by Haniel (1921, pl. 4, "Ofu," figs. 1–18, pl. 5).

niveus P. and F. Sarasin, 1899. Figure 18 (p. 536).

Amphidromus perversus niveus P. and F. Sarasin, 1899, Land-Moll. Celebes, pp. 209–210, pl. 26, fig. 262—Pare-Pare, Celebes.

Amphidromus perversus var. *niveus* P. and F. Sarasin, Pilsbry, 1900, Man. Conch., (2), 13: 149, pl. 51, fig. 47; Bollinger, 1918, Rev. Suisse Zool., 26: 332.

Amphidromus perversus perversus var. *nivea* P. and F. Sarasin, van Benthem Jutting, 1950, Treubia, 20: 48.

Lectotype.—Naturhistorisches Museum Basel No. 765i (specimen figured by Sarasin, loc. cit., fig. 262).

Distribution.—Celebes, Java and Borneo.

Classification.—A variety of *Amphidromus perversus perversus*.

obesus von Martens, 1867

Bulimus perversus obesus von Martens, 1867, Ostas. Landschn., p. 350—locality unknown.

Holotype.—Location unknown.

Classification.—A synonym of *Amphidromus perversus perversus*.

obesa Bavay and Dautzenberg, 1908

Amphidromus perrariabilis var. *obesa* Bavay and Dautzenberg, 1908, Jour. de Conch., 56: 247—Muong-Bo, Tonkin; Bavay and Dautzenberg, 1909, op. cit., 57: 280, pl. 10, fig. 3.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Tonkin.

Classification.—A color variant of *Amphidromus dautzenbergi*.

Remarks.—Although the name is preoccupied, no substitute name has been proposed.

obliquatus von Martens, 1903

Amphidromus adamsi obliquatus von Martens, 1903, Sitz.-Ber. Gesell. Naturf. Freunde, Berlin, 1903: 424-425, text fig.—Sangkulirang, East Borneo; von Martens, 1908, Mitteil. Zool. Mus. Berlin, 4: 287.

Holotype.—Location unknown.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus adamsii obliquatus*.

obscura Fulton, 1896

Amphidromus maculiferus var. *obscura* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 75—Mindanao Island, Philippine Islands; Pilsbry, 1900, Man. Conch., (2), 13: 131.

Amphidromus maculiferus maculiferus (Sowerby), Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 10-11, pl. 2, figs. 1-5.

Holotype.—Location unknown.

Classification.—A synonym of *Amphidromus maculiferus maculiferus*.

oculata von Martens, 1867 (see p. 673)**ornata** Fulton, 1896

Amphidromus adamsi var. *ornata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 82-83, pl. 5, fig. 14—Banguey Island, Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 223, pl. 69, fig. 41.

Lectotype.—British Museum (Natural History) No. 93.6.7.3.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus adamsii*.

oscitans von Martens, 1899

Amphidromus inconstans Fulton, 1898, Proc. Malac. Soc. London, 3: 10—Ombai, Alor Island; Fulton, 1899, op. cit., 3: 213.

Amphidromus oscitans von Martens, 1899, Arch. Naturg., 65: 29, pl. 3, figs. 3, 4—Alor Island; Pilsbry, 1900, Man. Conch., (2), 13: 204, pl. 67, figs. 1-3.

Holotype.—Zoologisch Museum der Humboldt Universität, Berlin.

Classification.—A synonym of *Amphidromus inconstans*.

pachychilus von Moellendorff, 1901

Amphidromus metabletus pachychilus von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 49—Nha-Trang, South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 24, figs. 32-36, pl. 25, figs. 37-38.

Holotype.—Senckenberg Museum No. 7587.

Distribution.—South Annam.

Classification.—*Amphidromus metabletus pachychilus*.

Remarks.—For nomenclatural purposes, var. *flava* is here considered synonymous with *pachychilus*.

palaceus Mousson, 1848

Bulimus palaceus Mousson, 1848, Mitt. naturf. Gesell., Zurich, 1: 266—Java; Mousson, 1849, Land. und Süssw. Moll., Java, pp. 28, 108, pl. 3, fig. 1; Pfeiffer, 1849, Syst. Conch. Cab., 1, 13, (1), pp. 134-135, pl. 40, figs. 5-8.

Amphidromus palaceus (Mousson), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 72; Pilsbry, 1900, Man. Conch., (2), 13: 134, pl. 47, figs. 1, 2, 4-6; Collinge, 1901, Jour. Malac., 8: 50-52, pl. 4, figs. 1-7; Gude, 1903, Jour. Malac., 10: 55; Bullen, 1904, Proc. Malac. Soc. London, 6: 109, pl. 6, fig. 6; Schepman, 1912, op. cit., 10: 234; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 213, 233; Oostingh, 1926, Meded. Landb. Hoogeschr., 26: 151; Scheiber, 1924, Trop. Natuur., 13: 108, fig. 6; Paravicini, 1935, Arch. f. Mollusk., 67: 173; van Benthem Jutting, 1937, Zool. Meded., 20: 93-94; Adam and Leloup, 1939, Mem. Mus. Roy. Nat. Hist. Belgique, hors ser., 2, (20), p. 32; van Benthem Jutting, 1941, Arch. Neerland. Zool., 5: 315-316; van Benthem Jutting, 1950, Treubia, 20: 479-483, fig. 93; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 164—localities in Sumatra.

Holotype.—Location unknown.

Distribution.—Java, Sumatra, Madura, Noesa Kembangan.

Classification.—*Amphidromus palaceus*.

palawanensis Bartsch, 1917

Amphidromus quadrasi palawanensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 39-40, pl. 1, fig. 15, pl. 20, figs. 1, 4, 6-9—Palawan Passage, Philippines; Bartsch, 1918, Jour. Washington Acad. Sci., 8: 363-364.

Holotype.—United States National Museum No. 99570.

Distribution.—Known only from the type specimens.

Classification.—A synonym of *Amphidromus quadrasi everetti*.

pallidulus Pilsbry, 1900

Amphidromus chloris var. *pallidulus* Pilsbry, 1900, Man. Conch., (2), 13: 143-144, pl. 50, figs. 31, 33 (lectotype), 34—Zamboanga, Mindanao, Philippine Islands.

Amphidromus pallidulus Pilsbry, Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 22-23, pl. 10, figs. 3 (lectotype), 8.

Lectotype.—Academy of Natural Sciences, Philadelphia No. 106459.

Distribution.—Mindanao, Philippine Islands.

Classification.—A color form of *Amphidromus chloris chloris*.

pattinsonae Iredale, 1943

Amphidromus (Syndromus) pattinsonae Iredale, 1943, Nautilus, 57, (1), p. 16, pl. 6, fig. 5—Maymyo Road, 40 miles northeast of Mandalay, Burma.

Holotype.—Australian Museum, Sydney, No. C. 63147.

Distribution.—Known only from the holotype.

Classification.—*Amphidromus pattinsonae*.

perakensis Fulton, 1901

Amphidromus aureus (Martyn) (part), Pilsbry, 1900, Man. Conch., (2), 13: 163-164, pl. 54, figs. 76-77; Sykes, 1902, Jour. Malac., 9: 60-61.

Amphidromus perakensis Fulton, 1901, Jour. Malac., 8: 104, pl. 9, figs. 8-10—Perak, Malaya; von Moellendorff, 1902, Nachr. Malak. Gesell., 34: 161; Collinge, 1902, Fasc. Malay., Zool., 2: 211-212; van Benthem Jutting, 1949, Bull. Raffles Mus., 19: 72-73.

Amphidromus perversus Collinge, 1902 (not Linné, 1758), Jour. Malac., 9: 81-83, pl. 4, figs. 24-25, pl. 5, figs. 25-28 (anatomy).

Lectotype.—British Museum (Natural History) No. 1902.5.28.12.

Distribution.—Malay Peninsula.

Classification.—*Amphidromus atricallosus* form *perakensis*.

Remarks.—The material reported on by Collinge (loc. cit.) as *A. perversus* is preserved at the Cambridge University Museum of

Zoology. Examination of the shells showed that the specimens dissected are referable to *A. perakensis* rather than to *A. perversus*.

perrieri Rochebrune, 1882. Figure 17 (p. 524).

Amphidromus perrieri Rochebrune, 1882, Bull. Soc. Phil., 6: 71—forest of Prek-Scholl, Cambodia.

Holotype.—Musée National d'Histoire Naturelle, Paris.

Classification.—The photograph of the type (fig. 17) confirms the suggestion of Fulton (1896, p. 90) that *perrieri* is a synonym of the *fasciata* variant of *Amphidromus glaucolarynx*.

pervariabilis Bavay and Dautzenberg, 1908

Amphidromus dautzenbergi Fulton, 1899, Proc. Malac. Soc. London, 3: 303, fig. 3—Tonkin; Pilsbry, Man. Conch., (2), 13: 166, pl. 62, fig. 66.

Amphidromus pervariabilis Bavay and Dautzenberg, 1908, Jour. de Conch., 56: 246–247—Tonkin; Bavay and Dautzenberg, 1909, op. cit., 57, pl. 9, figs. 1–10, pl. 10, figs. 1–8 (nominate race and varieties).

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Tonkin.

Classification.—A synonym of *Amphidromus dautzenbergi*.

perversus Linné, 1758

Helix perversa Linné, 1758, Syst. Nat., ed. 10, 1: 772—locality unknown.

Helix interrupta Müller, 1774, Hist. Verm. terr. fluv., 2: 94—locality not given.

Bulimus citrinus Bruguière (part), 1792, Encycl. Meth., p. 313; Pfeiffer, 1849, Zeits. Malak., 6: 130; Crosse and Fischer, 1863, Jour. de Conch., 11: 359.

Bulimus sultanicus Lamarck, 1822, Anim. sans Vert., 6, (2), p. 119—Java.

Amphidromus perversus (Linné), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 67–69; P. and F. Sarasin, 1899, Land-Moll. Celebes, pp. 208–210, pl. 26, fig. 262; Pilsbry, 1900, Man. Conch., (2), 13: 147–150, pl. 51, figs. 47–52; Gude, 1903, Jour. Malac., 10: 55; Dautzenberg and Fischer, 1906, Jour. de Conch., 53: 362–363; Schepman, 1912, Proc. Malac. Soc. London, 10: 234; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 233; Bollinger, 1918, Rev. Suisse Zool., 26: 331–332; Rensch, 1932, Zool. Jahrb., Syst., 63: 101; Paravicini, 1935, Arch. f. Mollusk., 67: 173; van Benthem Jutting, 1941, Arch. Nederl. Zool., 5: 316–319; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 164—localities in Sumatra.

Amphidromus interruptus (Müller), Pilsbry, 1900, Man. Conch., (2), 13: 150–153, pl. 52, figs. 53–56.

Amphidromus interruptus var. *emaciatus* (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 153–154, pl. 53, figs. 77, 78.

Amphidromus interruptus var. *sultanus* (Lamarck), Pilsbry, 1900, Man. Conch., (2), **13**: 154-156, pl. 53, figs. 66-67.

Amphidromus aureus (Martyn), Pilsbry, 1900, Man. Conch., (2), **13**: 160-161, pl. 54, figs. 70-72.

Amphidromus perversus perversus (Linné), van Benthem Jutting, 1950, Treubia, **20**: 487-489, fig. 97.

Amphidromus perversus interruptus (Müller), P. and F. Sarasin, 1899, Land-Moll. Celebes, pp. 209-210—Makassar, Celebes(?); van Benthem Jutting, 1950, Treubia, **20**: 489-491.

Amphidromus perversus rufocinctus Fruhstorfer, 1905, Nachr. Malak. Gesell., **37**: 197—Bawean Island.

Holotype.—Lost.

Distribution.—Most of Indonesia (see p. 533).

Classification.—*Amphidromus perversus perversus*. The nominate race of a highly variable polytypic species.

philippinensis Bartsch, 1917

Amphidromus philippinensis "Fulton" Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 4.

Remarks.—This name was a *lapsus calami* for *bilatanensis* Bartsch.

pictus Fulton, 1896

Amphidromus pictus Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 85, pl. 5, fig. 8—Kina Balu, North Borneo; Pilsbry, 1900, Man. Conch., (2), **13**: 226-227, pl. 70, fig. 62; von Martens, 1908, Mitteil. Zool. Mus. Berlin, **4**: 262.

Lectotype.—British Museum (Natural History) No. 96.6.13.391.

Distribution.—Borneo.

Classification.—*Amphidromus pictus*.

placidus Fulton, 1896

Amphidromus placidus Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 84, pl. 5, fig. 11—East Borneo; von Martens, 1908, Mitteil. Zool. Mus. Berlin, **4**: 262.

Amphidromus adamsi hamatus form *placidus* Fulton, Pilsbry, 1900, Man. Conch., (2), **13**: 225-226, pl. 70, fig. 64.

Lectotype.—British Museum (Natural History) No. 19601460.

Distribution.—Known only from the type collection.

Classification.—A color phase of *Amphidromus adamsii*.

placostylus von Moellendorff, 1900

Amphidromus placostylus von Moellendorff, 1900, Nachr. Malak. Gesell., **32**: 132—Phue-Son, Annam; Pilsbry, 1900, Man. Conch., (2), **13**: 178; Zilch, 1953, Arch. f. Mollusk., **82**: 138, pl. 25, fig. 41.

Holotype.—Senckenberg Museum No. 7593.

Distribution.—Known only from the type collection.

Classification.—*Amphidromus placostylus*.

Remarks.—Possibly *A. placostylus* is a form of *A. ingens* von Moellendorff.

poecilochroa Fulton, 1896

Amphidromus poecilochroa Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 77, pl. 6, fig. 7—Sumbawa Island; Pilsbry, 1900, Man. Conch., (2), **13**: 200–201, pl. 64, figs. 1–3; Fruhstorfer, 1905, Nachr. Malak. Gesell., **37**: 199.

Amphidromus contrarius poecilochrous Rensch, 1932, Zool. Jahrb., Syst., **63**: 97–98.

Lectotype.—British Museum (Natural History) No. 96.6.13.29.

Distribution.—Sumbawa Island.

Classification.—*Amphidromus poecilochrous*.

poecilus “Boettger” Fulton, 1896 (a manuscript name)

Remarks.—Fulton (1896, p. 73) listed *poecilus* as a name under which specimens of *Amphidromus heerianus* had been distributed to collectors.

poecilus “Pilsbry” van Benthem Jutting, 1941

Amphidromus heerianus var. *poecilus* “Pilsbry” van Benthem Jutting, 1941, Arch. Neerland. Zool., **5**: 314—Meeuwen Island off Java; van Benthem Jutting, 1950, Treubia, **20**: 484—localities in west Java.

Holotype.—Not designated, variety based on figures in Pilsbry (1900).

Distribution.—Meeuwen Island and Java.

Classification.—A color form of *Amphidromus heerianus*.

polymorpha Tapparone-Canefri, 1874

Cochlostyla polymorpha Tapparone-Canefri, 1874, Malac. del Viaggio della “Magenta,” p. 82, pl. 2, figs. 4a, 4b—Singapore (error).

Bulimus polymorphus (Tapparone-Canefri), de Morgan, 1885, Bull. Soc. Zool. France, **10**: 39; Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 71–72; Dautzenberg and Fischer, 1906, Jour. de Conch., **53**: 362–363—Saigon, Cochinchina and Samron-Seng, Cambodia.

Amphidromus comes polymorphus (Tapparone-Canefri), Pilsbry, 1900, Man. Conch., (2), **13**: 171–173, pl. 57, figs. 6–10.

Holotype.—Museo Civico di Storia Naturale, Genova.

Distribution.—Indo-China.

Classification.—A color phase of *Amphidromus comes*.

porcellanus Mousson, 1848

Bulimus porcellanus Mousson, 1848, Mitt. naturf. Gesell., Zurich, 1: 266—Java; Mousson, 1849, Land. und Süßw. Moll., Java, pp. 33–34, 110–111, pl. 2, fig. 4.

Amphidromus porcellanus (Mousson), von Martens, 1892, in WEBER, Zool. Ergeb., 2: 241—Deli, North Sumatra; Wiegmann, 1894, op. cit., 3: 204–208, pl. 15, figs. 2–11 (anatomy); Pilsbry, 1900, Man. Conch., (2), 13: 201, pl. 64, figs. 5–7; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 213, 233–234; Oostingh, 1926, Meded. Landb. Hoogesch., 26: 154; Paravicini, 1935, Arch. f. Mollusk., 67: 173; Adam and Leloup, 1939, Mem. Mus. Roy. Nat. Hist. Belgique, hors ser., 2, (20), p. 31, pl. 1, fig. 2; van Benthem Jutting, 1941, Arch. Nederl. Zool., 5: 319; Dammerman, 1948, Verh. Akad. Wett. Amst., 44, “Fauna of Krakatau,” pp. 514–515, pl. 11; van Benthem Jutting, 1950, Treubia, 20: 492–493, fig. 99; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 165.

Amphidromus contrarius porcellanus (Mousson), Rensch, 1932, Zool. Jahrb., Syst., 63: 56; Rensch, 1934, Trop. Binnengew., 4: 754–755.

Holotype.—Location unknown.

Distribution.—Java, Krakatau, Sumatra.

Classification.—*Amphidromus porcellanus*.

praeclara “Boettger” Fulton, 1896 (a manuscript name).

Remarks.—Fulton (1896, p. 74) listed *praeclara* as a name under which specimens of *Amphidromus winteri* had been distributed to collectors.

prillwitzi “Boettger” Fulton, 1896 (a manuscript name).

Remarks.—Fulton (1896, p. 73) listed *prillwitzi* as a name under which specimens of *Amphidromus heerianus* had been distributed to collectors.

protracta Bavay and Dautzenberg, 1908

Amphidromus perryiabilis var. *protracta* Bavay and Dautzenberg, 1908, Jour. de Conch., 56: 247—Tonkin; Bavay and Dautzenberg, 1909, op. cit., 57: 280, pl. 10, figs. 4–5.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Tonkin.

Classification.—A variation of *Amphidromus dautzenbergi*.

proxima Fulton, 1896

Amphidromus flarus var. *proxima* Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 81, pl. 6, fig. 4—locality unknown; Pilsbry, 1900, Man. Conch., (2), **13**: 198, pl. 63, fig. 94.

Holotype.—British Museum (Natural History) No. 96.6.13.48.

Distribution.—Probably Thailand.

Classification.—A color phase of *Amphidromus xiengensis*.

purissimus Pilsbry, 1900

Amphidromus chloris var. *purissimus* Pilsbry, 1900, Man. Conch., (2), **13**: 144, pl. 50, fig. 32—Basilan Island, Philippine Islands.

Amphidromus calista Bartsch, 1917, U. S. Nat. Mus., Bull. 100, **1**, pt. 1, pp. 23–24, pl. 11, fig. 3 (holotype).

Holotype.—Academy of Natural Sciences of Philadelphia No. 252717.

Distribution.—Known only from the type locality.

Classification.—A color form of *Amphidromus chloris chloris*.

purus Mousson, 1849

Bulimus purus Mousson, 1849, Land. und Süssw. Moll., Java, p. 29, pl. 3, fig. 2—Java; Mousson, Nov. Conch., **4**, (39), pp. 33–34, pl. 116, fig. 6.

Amphidromus palceus var. *pura* (Mousson), Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 73; Pilsbry, 1900, Man. Conch., (2), **13**: 135–136, pl. 47, fig. 3; Gude, 1903, Jour. Malac., **10**: 55; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, **31**: 233; van Benthem Jutting, 1950, Treubia, **20**: 481–482.

Amphidromus purus (Mousson), Paravicini, 1921, Arch. f. Mollusk., **53**: 113–116, pl. 2 (nest formation).

Holotype.—Location unknown.

Distribution.—West Java.

Classification.—A variation of *Amphidromus palceus*.

quadrasi Hidalgo, 1887

Amphidromus quadrasi Hidalgo, 1887, Jour. de Conch., **35**: 36, pl. 2, fig. 2—Caramandanes, Philippine Islands; Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 85–86; Pilsbry, 1900, Man. Conch., (2), **13**: 229–231, pl. 71, figs. 72–78; Kobelt, 1916, in SEMPER, Reisen im Philippinen, **10**: 348–349, pl. 80, figs. 5–7.

Amphidromus quadrasi quadrasi Hidalgo, Bartsch, 1917, U. S. Nat. Mus., Bull. 100, **1**, pt. 1, pp. 34–37, pl. 1, fig. 11, pl. 17, figs. 1–11; Bartsch, 1918, Jour. Washington Acad. Sci., **8**: 361–362.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Balabac and its satellites, Philippine Islands (nominate subspecies).

Classification.—*Amphidromus quadrasi quadrasi*.

reflexilabris Schepman, 1892. Figure 26 (p. 568).

Amphidromus reflexilabris Schepman, 1892, Notes Leyden Mus., 14: 152-153—Amarassi, west Timor; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 89-90, pl. 7, fig. 2; Pilsbry, 1900, Man. Conch., (2), 13: 206-207, pl. 65, fig. 21; Rensch, 1931, Zool. Jahrb., Syst., 60: 447-448; Rensch, 1935, Sitz.-Ber. Gesell. Naturf. Freunde, Berlin, 1935: 334-335.

Amphidromus sp. Haniel, 1921, Zeits. Induct. Abstamm. Vererbungsl., 25: 1-88, pls. 1-2—Ofu and Tai-Osapi, Timor.

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden, No. "Amphidromus 37'N."

Distribution.—West Timor.

Classification.—*Amphidromus reflexilabris reflexilabris*.

rhabdota von Moellendorff, 1901

Amphidromus rhodostylus forma *rhabdota* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—South Annam; Zileh, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 16.

Holotype.—Senckenberg Museum No. 122340.

Distribution.—South Annam.

Classification.—A color phase of *Amphidromus rhodostylus*.

rhodostylus von Moellendorff, 1901

Amphidromus rhodostylus von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 47-48—South Annam; Pilsbry, 1901, Man. Conch., (2), 14: 168; Dautzenberg and Fischer, 1906, Jour. de Conch., 53: 364—Kampot, Cambodia and Phan-Ran, Annam; Zileh, 1953, Arch. f. Mollusk., 82: 133, pl. 22, figs. 12-18.

Holotype.—Senckenberg Museum No. 122336.

Distribution.—South Annam.

Classification.—*Amphidromus rhodostylus*.

Remarks.—For nomenclatural purposes, var. *simplex* is here considered synonymous with *rhodostylus*.

robustus Fulton, 1896

Bulimus winteri var. von Martens, 1867, Ostas. Landschn., pp. 353-355, pl. 20, fig. 4—Java.

Amphidromus robustus Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 73.

Amphidromus heerianus var. *robustus* Fulton, Pilsbry, 1900, Man. Conch., (2), **13**: 139, pl. 46, fig. 21; Gude, 1903, Jour. Malac., **10**: 55; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, **31**: 232; van Benthem Jutting, 1950, Treubia, **20**: 484-485.

Amphidromus winteri forma *robusta* Fulton, Oostingh, 1923, Meded. Landb. Hoogeschr., **26**: 152.

Holotype.—Location unknown.

Distribution.—Java.

Classification.—An individual variation of *Amphidromus heerianus*.

roemeri Pfeiffer, 1862

Bulimus roemeri Pfeiffer, 1862, Proc. Zool. Soc. London, **1862**: 274, pl. 36, fig. 4—Laos; Pfeiffer, 1864, Nov. Conch., **2**: 217, pl. 57, figs. 10-11.

Amphidromus roemeri (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 80; Pilsbry, 1900, Man. Conch., (2), **13**: 192-193, pl. 63, figs. 95-96.

Lectotype.—British Museum (Natural History) No. 19601450.

Distribution.—Laos.

Classification.—A form of *Amphidromus sinensis*.

roeseleri von Moellendorff, 1894

Amphidromus roeseleri von Moellendorff, 1894, Nachr. Malak. Gesell., **26**: 210-211—Jolo Islands, Philippine Islands; Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 75; Pilsbry, 1900, Man. Conch., (2), **13**: 144; Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 27, pl. 13, figs. 1-3; Zilch, 1953, Arch. f. Mollusk., **82**: 138, pl. 25, fig. 42 (figure of holotype).

Lectotype.—Senckenberg Museum No. 7598.

Distribution.—Known only from the Jolo (=Sulu) Islands, Philippine Islands.

Classification.—*Amphidromus chloris roeseleri*.

rollei Laidlaw and Solem, 1961. See page 571.

romaensis, Rolle, 1903

Amphidromus laevis var. *romaensis* Rolle, 1903, Nachr. Malak. Gesell., **35**: 157—Roma Island, Timor; Zilch, 1953, Arch. f. Mollusk., **82**: 133, pl. 22, fig. 11.

Lectotype.—Senckenberg Museum No. 7574a.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus laevis*.

rosa Pilsbry, 1900

Amphidromus chloris rosa Pilsbry, 1900, Man. Conch., (2), 13: 144, pl. 50, fig. 38—Basilan Island, Philippine Islands.

Amphidromus calista Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 23-24, pl. 11, fig. 2 (holotype).

Holotype.—Academy of Natural Sciences of Philadelphia No. 252718.

Distribution.—Basilan Island.

Classification.—A color phase of *Amphidromus chloris chloris*.

rosea Fulton, 1896

Bulimus sinistralis forma C, von Martens, 1867, Ostas. Landschn., p. 356, pl. 21, fig. 2 c—northern Celebes.

Amphidromus sinistralis var. *rosea* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 76—no locality given; Pilsbry, 1900, Man. Conch., (2), 13: 232-233, pl. 68, figs. 24-25.

Holotype.—Location unknown.

Distribution.—Northern Celebes.

Classification.—A color phase of *Amphidromus sinistralis*.

roseolabiatus Fulton, 1896

Amphidromus roseolabiatus Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 89, pl. 6, fig. 8—Siam; Pilsbry, 1900, Man. Conch., (2), 13: 188, pl. 60, fig. 36.

Lectotype.—British Museum (Natural History) No. 19601462.

Distribution.—Known only from two specimens.

Classification.—*Amphidromus roseolabiatus*.

roseolineata von Moellendorff, 1901

Amphidromus rhodostylus forma *roseolineata* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—Siam; Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 13.

Holotype.—Senckenberg Museum No. 122337.

Distribution.—Known only from the type collection.

Classification.—A color phase of *Amphidromus rhodostylus*.

roseotincta von Moellendorff, 1894

Amphidromus annamiticus var. *roseotincta* von Moellendorff, 1894, Proc. Zool. Soc. London, 1894: 150—Siam.

Amphidromus intersus annamiticus var. *roseotincta* von Moellendorff, Pilsbry, 1900, Man. Conch., (2), 13: 170.

Amphidromus inversus roseotincta von Moellendorff, Zilch, 1953, Arch. f. Mollusk., 82: 135, pl. 23, fig. 26.

Lectotype.—Senckenberg Museum No. 7546.

Distribution.—Thailand.

Classification.—A color phase of *Amphidromus inversus annamiticus*.

***rubiginosa* Fulton, 1896**

Amphidromus adamsi var. *rubiginosa* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 84—North Borneo; Rensch, 1934, Arch. f. Mollusk., 66: 335.

Amphidromus adamsi rubiginosus Fulton, Pilsbry, 1900, Man. Conch., (2), 13: 224, pl. 69, figs. 49–50.

Holotype.—Location unknown.

Distribution.—North Borneo.

Classification.—A color phase of *Amphidromus adamsii*.

***rufocincta* Fulton, 1896**

Amphidromus adamsi var. *rufocincta* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 83, pl. 5, fig. 1—Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 223, pl. 69, fig. 42.

Lectotype.—British Museum (Natural History) No. 96.6.13.11.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus adamsii*.

***rufocinctus* Fruhstorfer, 1905**

Amphidromus perversus rufocinctus Fruhstorfer, 1905, Nachr. Malak. Gesell., 37: 199—Bawean Island; Zilch, 1953, Arch. f. Mollusk., 82: 138, pl. 25, fig. 39.

Lectotype.—Senckenberg Museum No. 28099a.

Distribution.—Bawean and possibly Kangean Islands.

Classification.—*Amphidromus perversus rufocinctus*.

Remarks.—The name *rufocincta* Fulton, 1896, was proposed as a variety and thus has no nomenclatural standing, allowing use of the name *rufocinctus* Fruhstorfer, 1905.

***samarensis* Bartsch, 1917**

Amphidromus maculiferus samarensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 17, pl. 7, fig. 4—Samar Island, Philippine Islands.

Holotype.—United States National Museum No. 215579.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus maculiferus multicolor*.

sankapurus Fruhstorfer, 1905

Amphidromus perversus rufocinctus var. *sankapurus* Fruhstorfer, 1905, *Nachr. Malak. Gesell.*, **37**: 200—Bawean Island; Zilch, 1953, *Arch. f. Mollusk.*, **82**: 138, pl. 25, fig. 40.

Lectotype.—Senckenberg Museum No. 28109a.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus perversus rufocinctus*.

schomburgki Pfeiffer, 1860

Bulimus schomburgki Pfeiffer, 1860, *Proc. Zool. Soc. London*, **1860**: 137, pl. 51, fig. 9—Siam; von Martens, 1867, *Ostas. Landschn.*, pp. 79–80; Morlet, 1889, *Jour. de Conch.*, **37**: 127.

Bulimus crossei Pfeiffer, 1862, *Jour. de Conch.*, **10**: 43–44, pl. 5, figs. 4–5—Siam.

Amphidromus schomburgki (Pfeiffer), Morlet, 1889, *Jour. de Conch.*, **37**: 127; Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 90–91; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 182, pl. 59, fig. 30.

Lectotype.—British Museum (Natural History) No. 19601452.

Distribution.—Thailand.

Classification.—*Amphidromus schomburgki*.

secamensis Bartsch, 1919

Amphidromus versicolor secamensis Bartsch, 1919, *Proc. Biol. Soc. Washington*, **32**: 182—Secam Island, Calamianes, Philippine Islands.

Holotype.—United States National Museum No. 336029.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi quadrasi* var. *versicolor*.

semifrenatus von Martens, 1900

Amphidromus semifrenatus von Martens, 1900, *Nachr. Malak. Gesell.*, **32**: 8–9—Deli, North Sumatra; Pilsbry, 1900, *Man. Conch.*, (2), **13**: 219–220; Vernhout, 1913 (part), *Notes Leyden Mus.*, **35**: 154–155, figs. 1–2; Degner, 1928, *Treubia*, **10**: 361; Rensch, 1934, *Arch. f. Mollusk.*, **66**: 335; van Benthem Jutting, 1959, *Beaufortia*, **7**, (83), p. 164—localities in Sumatra.

Holotype.—Zoologische Museum der Humboldt Universität, Berlin.

Distribution.—North Sumatra.

Classification.—*Amphidromus semifrenatus*.

semirugosa “Boettger” Fulton, 1896

Remarks.—Fulton (1896, p. 74) listed this as a name under which specimens of *Amphidromus winteri* had been distributed to collectors.

semitessellatus Morlet, 1884

Bulimus (*Amphidromus*) *semitessellatus* Morlet, 1884, *Jour. de Conch.*, **32**: 387–388, pl. 11, figs. 2, 2a—Laos; Morlet, 1889, *Jour. de Conch.*, **37**: 128.

Amphidromus semitessellatus (Morlet), Fulton, 1896, *Ann. Mag. Nat. Hist.*, (6), **17**: 87; Pilsbry, 1900, *Man. Conch.*, (2), **17**: 194, pl. 60, figs. 41–44; Dautzenberg and Fischer, 1906, *Jour. de Conch.*, **54**: 363–364—Kampot, Chaine de l’Elephant, Cambodia, at 500 meters.

Holotype.—Not designated. Morlet’s material in Musée National d’Histoire Naturelle, Paris.

Distribution.—Thailand and Laos.

Classification.—*Amphidromus semitessellatus*.

sierahensis Pilsbry, 1900

Amphidromus columellaris var. *sierahensis* Pilsbry, 1900, *Man. Conch.*, (2), **13**: 214, pl. 65, fig. 33—Sierah Island, Tenimber Islands.

Holotype.—Academy of Natural Sciences of Philadelphia No. 72584.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus columellaris*.

simalurensis Laidlaw, 1954. Figure 23 (p. 559).

Amphidromus webbi *simalurensis* Laidlaw, 1954, *Zool. Meded.*, **33**: 78–79—Simalur Island, Mentawi Islands.

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden, No. “*Amphidromus* 12’A.”

Distribution.—Known only from the type locality.

Classification.—*Amphidromus webbi* *simalurensis*.

similis Pilsbry, 1900. Figures 15, A, 21 (pp. 516, 556).

Amphidromus perversus var. *atricallosus* Schepman, 1895 (not Gould, 1843), Notes Leyden Mus., **17**: 156—Mount Sekedau and Mount Dadap, West Borneo; Smith, 1895, *Proc. Zool. Soc. London*, **1895**: 115, pl. 3, fig. 19—Sadong, west Sarawak.

Amphidromus perversus forma *similis* Pilsbry, 1900, Man. Conch., (2), 13: 150, pl. 51, fig. 52.

Amphidromus perversus similis Pilsbry, 1900, Man. Conch., (2), 13: 247 (a plate caption).

Holotype.—Rijksmuseum van Natuurlijke Historie, Leiden “*Amphidromus* No. 8'f.”

Distribution.—Mount Dadap and Mount Sekedau, Borneo, and Sadong, Sarawak.

Classification.—*Amphidromus similis*.

Remarks.—Pilsbry never saw any of the cited specimens and in the text used *similis* as a varietal name (form *similis*). On the plate caption he used *similis* as a subspecific name and on that basis we are crediting the name to him. Nomenclatural quibbling might technically force the name *similis* to date from this paper and authors. Pilsbry clearly recognized the distinctness of the form and we prefer that he retain credit.

Although Pilsbry copied a figure of the Sadong specimen in the British Museum collection, we are selecting one of the figured Mount Dadap shells as holotype. Pilsbry saw none of the specimens and as first revisers we are selecting one of the better examples as holotype.

simplex Fulton, 1896

Amphidromus adamsi var. *simplex* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 83, pl. 5, fig. 12—Banguey Island, Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 222, pl. 69, fig. 44.

Lectotype.—British Museum (Natural History) No. 96.6.13.4.

Distribution.—Known only from the type specimens.

Classification.—A color phase of *Amphidromus adamsii*.

simplex von Moellendorff, 1901 (not Fulton, 1896)

Amphidromus rhodostylus var. *simplex* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 12.

Holotype.—Senckenberg Museum No. 122336.

Distribution.—Known only from the type collection.

Classification.—A synonym of *Amphidromus rhodostylus rhodostylus*.

Remarks.—The variety *simplex* was taken by von Moellendorff to have the typical color pattern of *Amphidromus rhodostylus rhodostylus*. In modern nomenclatural usage, the typical form takes the

species name; thus, *simplex* becomes an objective synonym of *rhodostylus*.

sinensis Benson, 1851

Bulimus sinensis Benson, 1851, Ann. Mag. Nat. Hist., (2), 7: 264-265—Canton, South China; Pfeiffer, 1853, Syst. Conch. Cab., I, 13, (1), pp. 67-68, pl. 20, figs. 1, 2.

Amphidromus sinensis (Benson), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 80; Pilsbry, 1900, Man. Conch., (2), 13: 190-192, pl. 62, figs. 64, 65; Gude, 1914, Fauna Brit. India, Moll., 2: 182-184.

Holotype.—Missing from the Benson collection at Cambridge University and presumed lost.

Distribution.—Pegu, Prome, Tongoop, Akyab, Burma; Chittagong, Pakistan; Khasi Hills, India; and Laos. The Canton locality is doubtful.

Classification.—*Amphidromus sinensis*.

singalangensis Rolle, 1908

Amphidromus singalangensis Rolle, 1908, Nachr. Malak. Gesell., 40: 67—west Sumatra.

Amphidromus sumatranaus singalangensis Rolle, Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 23, fig. 20; van Benthem Jutting, 1959, Beaufortia, 7, (83), p. 165—Mount Singalang, near Padang Pandiang, Sumatra.

Lectotype.—Senckenberg Museum No. 7671.

Distribution.—West Sumatra.

Classification.—*Amphidromus sumatranaus singalangensis*.

sinistra Müller, 1774

Helix sinistra Müller, 1774, Hist. Verm. terr. fluv., 2: 90-93; Pfeiffer, 1849, Zeits. Malak., 6: 130.

Holotype.—Universitets Zoologiske Museum, Copenhagen.

Classification.—A synonym of *Amphidromus perversus*.

sinistralis Reeve, 1849

Helix laeva Quoy and Gaimard, 1832 (not Müller, 1774), Voy. Astrolabe, Zool., 2: 120-121, pl. 10, fig. 4 (living animal).

Bulimus laevis Deshayes, 1843, Hist. Moll. terr. fluv., 2, (2), pp. 18-19, pl. 161, figs. 11, 14-18.

Bulimus sinistralis Reeve, 1849, Conch. Icon., *Bulimus*, pl. 81, fig. 603—Java; von Martens, 1867, Ostas. Landsch., pp. 355-356, pl. 21, figs. 2 a-c, 11.

Amphidromus sinistralis (Reeve), Tapparone-Canefri, 1883, Ann. Mus. Civ. Genova, 20: 147-148; Semper, 1874, Reisen im Philippinen, 3: 146, pl. 16,

fig. 22; Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 76; P. and F. Sarasin, 1899, Land-Moll. Celebes, pp. 212-213, pl. 31, fig. 303 (anatomy); Pilsbry, 1900, Man. Conch., (2), **13**: 232-233, pl. 68, figs. 23-31; Gredler, 1902, Nachr. Malak. Gesell., **34**: 62; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, **31**: 279-280; Zilch, 1953, Arch. f. Mollusk., **82**: 133.

Lectotype.—British Museum (Natural History) No. 19601428.

Distribution.—North and west Celebes.

Classification.—*Amphidromus sinistralis sinistralis*.

smithi Fulton, 1896

Amphidromus smithi Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 88-89, pl. 7, figs. 12, 12a (lectotype)—Annam; Pilsbry, 1900, Man. Conch., (2), **13**: 186, pl. 60, figs. 37-38; von Moellendorff, 1900, Nachr. Malak. Gesell., **32**: 132.

Lectotype.—British Museum (Natural History) No. 96.6.13.37.

Distribution.—Known only from the type collection.

Classification.—*Amphidromus smithi*.

solida Fulton, 1896

Amphidromus quadrasi var. *solida* Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 86, pl. 5, fig. 16—Palawan, Philippine Islands.

Amphidromus versicolor solidus (Fulton), Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 39-40, pl. 1, fig. 15, pl. 20, figs. 1-4.

Amphidromus versicolor everetti Fulton, Bartsch, 1918, Jour. Washington Acad. Sci., **8**: 363.

Lectotype.—British Museum (Natural History) No. 96.6.13.10.

Distribution.—Palawan, Philippine Islands.

Classification.—A color phase of *Amphidromus quadrasi everetti*.

sowerbyi Fulton, 1907

Amphidromus sowerbyi Fulton, 1907, Ann. Mag. Nat. Hist., (7), **19**: 152, pl. 9, fig. 10—Nias Island, Sumatra; van Benthem Jutting, 1934, Misc. Zool., Sumatrana, **84-85**: 15-16; van Benthem Jutting, 1935, op. cit., **89**: 3-4.

Lectotype.—British Museum (Natural History) No. 1907.5.3.121.

Distribution.—Nias and Simalur Islands, Sumatra.

Classification.—A color phase of *Amphidromus sumatranaus niasensis*.

strigata Fulton, 1896

Amphidromus maculifcrus var. *strigata* Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 75—Mindanao Island, Philippine Islands; Pilsbry, 1900, Man. Conch., (2), **13**: 133; Kobelt, 1916, in SEMPER, Reisen im Philippinen, **10**: 346-347.

Amphidromus maculiferus strigatus Fulton, Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 14-15, pl. 6, figs. 1-5; Zilch, 1953, Arch. f. Mollusk., 82: 137, pl. 24, fig. 28.

Lectotype.—Senckenberg Museum No. 27592.

Distribution.—Eastern Mindanao.

Classification.—A synonym of *Amphidromus maculiferus multicolor*.

strigosus von Martens, 1867

Bulimus interruptus var. *strigosus* von Martens, 1867, Ostas. Landschn., p. 344, pl. 2, fig. 6—south Celebes.

Amphidromus perversus var. *strigosa* (von Martens), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 69; Pilsbry, 1900, Man. Conch., (2), 13: 151-152, pl. 52, figs. 57-58.

Holotype.—Location unknown.

Distribution.—Java, Borneo, Bali, south Celebes.

Classification.—A color phase of *Amphidromus perversus perversus*.

subaurantia Fulton, 1896

Bulimus palaceus var. C, von Martens, 1867, Ostas. Landschn., p. 352—no locality.

Amphidromus palaceus var. *subaurantia* "Martens" Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 72—Java; Pilsbry, 1900, Man. Conch., (2), 13: 135; Gude, 1903, Jour. Malac., 10: 55; van Benthem Jutting, 1950, Treubia, 20: 482.

Holotype.—Location unknown.

Distribution.—Java.

Classification.—A color phase of *Amphidromus palaceus*.

subconcolor von Martens, 1867

Bulimus contrarius var. *subconcolor* von Martens, 1867, Ostas. Landschn., p. 365, pl. 21, fig. 9—Kupang, Timor.

Amphidromus laevis (Müller), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 76.

Amphidromus contrarius var. *subconcolor* (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 212, pl. 65, fig. 28.

Holotype.—Location unknown.

Distribution.—West Timor.

Classification.—A color phase of *Amphidromus contrarius contrarius*.

subconcolor P. and F. Sarasin, 1899 (not von Martens, 1867).
Figure 33 (p. 578).

Amphidromus contrarius var. *subconcolor* P. and F. Sarasin, 1899 (not von Martens, 1867), Land-Moll. Celebes, p. 210, pl. 26, fig. 258—Bungi, Gulf of Mandar, southwest Celebes.

Amphidromus maculatus bungensis Pilsbry, 1900, Man. Conch., (2), 13: 250, pl. 64, fig. 12—new name for *subconcolor* P. and F. Sarasin.

Lectotype.—Naturhistorisches Museum, Basel No. 4985a.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus maculatus bungensis*.

subconfluens von Moellendorff, 1901

Amphidromus rhodostylus var. *subconfluens* von Moellendorff, 1901, Nachr. Malak. Gesell., 33: 48—South Annam; Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 22, fig. 18.

Holotype.—Senckenberg Museum No. 122344.

Distribution.—Known only from the type collection.

Classification.—A variant of *Amphidromus rhodostylus*.

subporcellana Rolle, 1903

Amphidromus inconstans var. *gracilis* forma *subporcellana* Rolle, 1903, Nachr. Malak. Gesell., 35: 157—Roma Island, Timor; Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, fig. 8.

Lectotype.—Senckenberg Museum No. 7567a.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus inconstans*.

subsimplex Rolle, 1903

Amphidromus inconstans var. *gracilis* forma *subsimplex* Rolle, 1903, Nachr. Malak. Gesell., 35: 157—Roma Island, Timor; Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, fig. 6.

Lectotype.—Senckenberg Museum No. 7568a.

Distribution.—Known only from the type locality.

Classification.—A variety of *Amphidromus inconstans*.

subunicolor Fulton, 1896

Bulimus adamsi var. C, von Martens, 1867, Ostas. Landschn., p. 357.

Amphidromus adamsi var. *subunicolor* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 82, pl. 5, fig. 5—Banguey Island, Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 222, pl. 69, fig. 35.

Lectotype.—British Museum (Natural History) No. 96.6.13.46.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus adamsii*.

sulphuratus Hombron and Jacquinot, 1852

Bulimus sulphuratus Hombron and Jacquinot, 1852, Voy. au Pol. Sud., Moll., pl. 8, figs. 10–12—Zamboanga, Mindanao, Philippine Islands.

Bulimus (perversus var.) sulphuratus Hombron and Jacquinot, von Martens, 1867, Ostas. Landschn., p. 351.

Amphidromus chloris (Reeve), Pilsbry, 1900, Man. Conch., (2), 13: 142–144.

Holotype.—Probably in the Musée National d'Histoire Naturelle, Paris.

Classification.—A synonym of *Amphidromus chloris*.

sultanus Lamarck, 1822

Bulimus sultanus Lamarck, 1822, Anim. sans Vert., 6, (2), p. 119—Java; Pfeiffer, 1849, Zeits. Malak., 6: 132; von Martens, 1867, Ostas. Landschn., p. 342, pl. 22, figs. 1, 3, 4; Mermod, 1951, Rev. Suisse Zool., 58: 725–726, fig. 76.

Bulimus interruptus var. *sultanus* Lamarck, Mousson, 1849, Land. und Süßw. Moll., Java, pp. 31, 109.

Amphidromus sultanus (Lamarck), von Martens, 1892, in WEBER, Zool. Ergeb., 2: 240.

Amphidromus perversus var. *interrupta* (Müller), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 68.

Amphidromus interruptus sultanus (Lamarck), Pilsbry, 1900, Man. Conch., (2), 13: 154–155, pl. 53, figs. 66–74; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 232.

Amphidromus perversus interruptus var. *sultana* (Lamarck), van Benthem Jutting, 1950, Treubia, 20: 491.

Holotype.—Musée de Genève (see Mermod, loc. cit.).

Distribution.—Java, Borneo, Bali, south Celebes.

Classification.—A color phase of *Amphidromus perversus perversus*.

suluensis Bartsch, 1917

Amphidromus chloris suluensis Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, pp. 26–27, pl. 1, fig. 5, pl. 11, figs. 5, 7–10, pl. 12, figs. 7, 9—Sulu Island, Philippine Islands.

Holotype.—United States National Museum No. 99564.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus chloris chloris*.

sumatranus von Martens, 1864

Bulimus sumatranus von Martens, 1864, Monatsber. Berlin Akad. Wissen., 1864: 526—Kapahiang, Sumatra; von Martens, 1867, Ostas. Landschn., p. 366, pl. 21, fig. 6.

Amphidromus sumatranus (von Martens), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 88; Dautzenberg, 1899, Ann. Soc. Roy. Malak. Belgique, 34: 6, pl. 1, figs. 2, 2a; Pilsbry, 1900, Man. Conch., (2), 13: 218-219, pl. 66, figs. 35-37; Rensch, 1934, Arch. f. Mollusk., 66: 335-336; Adam and Leloup, 1939, Mem. Mus. Roy. Nat. Hist. Belgique, hors ser., 2: 35-36, pl. 1, fig. 3 a-d; van Benthem Jutting, 1959, Beaufortia, 7, (83), pp. 164-165.

Syndromus sumatranus (von Martens), Laidlaw, 1954, Zool. Meded., 33: 80-81.

Holotype.—Zoologisch Museum der Humboldt Universität, Berlin.

Distribution.—Sumatra and Mentawi Islands.

Classification.—*Amphidromus sumatranus sumatranus*.

sumbaensis Fulton, 1896

Amphidromus sumbaensis Fulton, 1896, Ann. Mag. Nat. Hist., (6), 18: 102—Sumba Island; Fulton, 1897, op. cit., (6), 20: 214, pl. 6, fig. 1; Pilsbry, 1900, Man. Conch., (2), 13: 208, pl. 67, figs. 5-8; van Benthem Jutting, 1928, Treubia, 10: 159.

Amphidromus latestrigatus Schepman, Rensch, 1932, Zool. Jahrb., Syst., 63: 99, figs. 37-38.

Lectotype.—British Museum (Natural History) No. 96.6.13.41.

Distribution.—Flores and Sumba Islands, possibly Bali.

Classification.—A color phase of *Amphidromus latestrigatus*.

superba Fulton, 1896

Amphidromus adamsi var. *superba* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 83, pl. 5, fig. 10—Banguey Island, Borneo; Pilsbry, 1900, Man. Conch., (2), 13: 223, pl. 69, fig. 43.

Lectotype.—British Museum (Natural History) No. 96.6.13.1.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus adamsii*.

suspectus von Martens, 1864

Bulimus suspectus von Martens, 1864, Monatsber. Berlin Akad. Wissen., 1864: 526—Kupang, Timor; von Martens, 1867, Ostas. Landschn., p. 362, pl. 21, fig. 8.

Amphidromus suspectus (von Martens), Schepman, 1892, Notes Leyden Mus., 14: 153-154—Sumba; Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 78-79; Pilsbry, 1900, Man. Conch., (2), 13: 213, pl. 65, fig. 30; Bullen, 1906, Proc.

Malac. Soc. London, **7**: 126—Mount Ophir, Sumatra; van Benthem Jutting, 1928, Treubia, **10**: 159; van Benthem Jutting, 1959, Beaufortia, **7**, (83), pp. 165–166.

Amphidromus contrarius (Müller), Rensch, 1932, Zool. Jahrb., Syst., **63**: 96.

Holotype.—Location unknown.

Distribution.—Timor.

Classification.—A color variant of *Amphidromus contrarius contrarius*.

sykesi Fruhstorfer, 1905

Amphidromus enganoensis forma *sykesi* Fruhstorfer, 1905, Nachr. Malak. Gesell., **37**: 198–201—Engano Island, Sumatra; van Benthem Jutting, 1937, Treubia, **16**: 50.

Amphidromus enganoensis *sykesi* Fruhstorfer, Zilch, 1953, Arch. f. Mollusk., **82**: 134, pl. 23, fig. 24.

Lectotype.—Senckenberg Museum No. 28126a.

Distribution.—Known from the type locality only.

Classification.—A variant of *Amphidromus enganoensis*.

sylheticus Reeve, 1849

Bulimus sylheticus Reeve, 1849, Conch. Icon., *Bulimus*, pl. 77, fig. 564—Sylhet, eastern Himalayas; Pfeiffer, 1853, Syst. Conch. Cab., **1**, 13, (1), p. 68, pl. 20, figs. 25–26; Hanley and Theobald, 1876, Conch. Indica, pl. 19, fig. 9.

Amphidromus sylheticus (Reeve), Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 79–80; Pilsbry, 1900, Man. Conch., (2), **13**: 189, pl. 63, figs. 97–98; Gude, 1914, Fauna Brit. India, Moll., **2**: 180–181.

Holotype.—Location unknown.

Distribution.—Khasi and Garo Hills, Assam.

Classification.—*Amphidromus sylheticus*.

tener von Martens, 1867. Figure 22 (p. 556).

Bulimus perversus *tener* von Martens, 1867, Ostas. Landschn., p. 350—locality unknown.

Amphidromus perversus var. *tenera* (von Martens), Fulton, 1896, Ann. Mag. Nat. Hist., (6), **17**: 67.

Amphidromus palaceus var. *tener* (von Martens), Pilsbry, 1900, Man. Conch., (2), **13**: 136–137 (not cited figures); Gude, 1903, Jour. Malac., **10**: 55.

Amphidromus palaceus var. *tenera* (von Martens), Leschke, 1914, Mitt. Naturh. Mus. Hamburg, **31**: 232; van Benthem Jutting, 1950, Treubia, **20**: 483.

Holotype.—Location unknown.

Distribution.—Java.

Classification.—A variety of *Amphidromus palaceus*.

teysmanni Pfeiffer, 1871 (Mousson mss.)

Bulimus teysmanni Pfeiffer, 1871, Nov. Conch., 4: 32–33, pl. 116, figs. 2–3—
Moluccas(?); von Martens, 1873, Malak. Blätt., 20: 154.

Amphidromus teysmanni (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17:
73—Moluccas(?); Pilsbry, 1900, Man. Conch., (2), 13: 134, pl. 47, figs. 8–9.

Holotype.—Location unknown.

Distribution.—Known only from the type specimens.

Classification.—Is probably only a variant of *Amphidromus winteri*.

theobaldianus Benson, 1857

Bulimus theobaldianus Benson, 1857, Ann. Mag. Nat. Hist., (2), 19: 329–330—
Yanglaw, Tenasserim.

Amphidromus theobaldianus (Benson), Theobald, 1876, Jour. Asiat. Soc. Bengal,
45, (2), p. 187, pl. 14, fig. 8.

Amphidromus moniliferus (Gould), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17:
90; Pilsbry, 1900, Man. Conch., (2), 13: 179–180, pl. 62, figs. 73–74;
Gude, 1914, Fauna Brit. India, Moll., 2: 180.

Holotype.—Location unknown.

Distribution.—Burma.

Classification.—A synonym of *Amphidromus moniliferus*.

tricolor Bavay and Dautzenberg, 1909

Amphidromus pervariabilis var. *tricolor* Bavay and Dautzenberg, 1909, Jour.
de Conch., 57: 281, pl. 9, fig. 10—Tonkin.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus dautzenbergi*.

tritaeniata von Moellendorff, 1901

Amphidromus metabletus pachychilus forma *tritaeniata* von Moellendorff, 1901,
Nachr. Malak. Gesell., 33: 49—South Annam; Zilch, 1953, Arch. f. Mollusk.,
82: 137, pl. 24, fig. 34.

Holotype.—Senckenberg Museum No. 7587.

Distribution.—Known only from the type collection.

Classification.—A color phase of *Amphidromus metabletus*.

trizona von Moellendorff, 1901

Amphidromus metabletus pachychilus forma *trizona* von Moellendorff, 1901,
Nachr. Malak. Gesell., 33: 49—South Annam; Zilch, 1953, Arch. f. Mollusk.,
82: 137, pl. 24, fig. 35.

Holotype.—Senckenberg Museum No. 122350.

Distribution.—Known only from the type collection.

Classification.—A color phase of *Amphidromus metabletus*.

tryoni Pilsbry, 1900

Amphidromus xiengensis var. *tryoni* Pilsbry, 1900, Man. Conch., (2), 13:
196, pl. 63, fig. 78—mountains of Laos.

Lectotype.—Academy of Natural Sciences, Philadelphia No. 31488.

Distribution.—Known only from the type material.

Classification.—A variety of *Amphidromus xiengensis*.

varians von Moellendorff, 1898

Amphidromus haematostoma forma *varians* von Moellendorff, 1898, Nachr.
Malak. Gesell., 30: 74–75—Boloven Plateau, east bank of Mekong River,
Annam; Pilsbry, 1900, Man. Conch., (2), 13: 183; Zilch, 1953, Arch. f.
Mollusk., 82: 132, pl. 22, fig. 5.

Holotype.—Senckenberg Museum No. 7561.

Distribution.—Known only from the type locality.

Classification.—A color phase of *Amphidromus haematostomus*.

ventrosulus von Moellendorff, 1900

Amphidromus smithi *ventrosulus* von Moellendorff, 1900, Nachr. Malak. Gesell.,
32: 132–133—Phue-Suc, Annam.

Amphidromus smithi var. *ventrosulus* von Moellendorff, Pilsbry, 1900, Man.
Conch., (2), 13: 187; Zilch, 1953, Arch. f. Mollusk., 82: 133, pl. 23, fig. 19.

Lectotype.—Senckenberg Museum No. 7643.

Distribution.—Known only from the type collection.

Classification.—*Amphidromus ventrosulus*.

versicolor Fulton, 1896

Amphidromus quadrasi var., Smith, 1893, Ann. Mag. Nat. Hist., (6), 11:
347, pl. 8, fig. 11 (lectotype).

Amphidromus versicolor Fulton, 1896, op. cit., (6), 17: 86—Balabac, Philippine
Islands; Kobelt, 1916, in SEMPER, Reisen im Philippinen, 10: 350–352,
pl. 81, figs. 3–14.

Amphidromus quadrasi var. *versicolor* Fulton, Pilsbry, 1900, Man. Conch., (2),
13: 230–231, pl. 71, figs. 84–91.

Amphidromus quadrasi versicolor Fulton, Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 37, pl. 1, fig. 7, pl. 18, figs. 1-10.

Amphidromus quadrasi solidus Bartsch, 1917, op. cit., p. 38, pl. 1, figs. 8, 9, 12-14, pl. 19, figs. 1, 3, 7, pl. 20, figs. 3, 5.

Amphidromus versicolor versicolor Fulton, Bartsch, 1918, Jour. Washington Acad. Sci., 8: 363.

Lectotype.—British Museum (Natural History) No. 93.3.5.54.

Distribution.—Balabac and its satellites, Philippine Islands.

Classification.—*Amphidromus quadrasi quadrasi*.

vicaria Fulton, 1896

Bulimus sincensis Hanley and Theobald, 1870 (not Benson, 1851), Conch. Indica, pl. 21, figs. 5-6.

Amphidromus sinensis var. *vicaria* Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 80—Pegu, Burma; Pilsbry, 1900, Man. Conch., (2), 13: 191, pl. 62, figs. 67-69; Gude, 1914, Fauna Brit. India, Moll., 2: 183-184.

Holotype.—Location unknown.

Distribution.—Pegu, Burma, and Chittagong, Pakistan.

Classification.—A variant of *Amphidromus sinensis*.

virescens Swainson, 1822

Bulimus virescens Swainson, 1822, Catalogue of the rare and valuable shells which formed the celebrated collection of the late Mrs. Bligh, Appendix, p. 13—locality not known (reference not seen).

Bulimus citrinus var. *virescens* Swainson, 1822-3, Zool. Illustr., 3: pl. 166, fig. 1—not locality.

?*Amphidromus comes* (Pfeiffer), Pilsbry, 1900, Man. Conch., (2), 13: 171.

Amphidromus virescens (Swainson), Walker, 1924, Nautilus, 37, (3), pp. 84-88, pl. 5—“Java et les îles de la Soude.”

Holotype.—Possibly in the British Museum (Natural History) but not recognized at the present time.

Distribution.—Unknown.

Classification.—Uncertain. Without discovery and examination of the holotype it is impossible to decide whether this is *A. comes*, *A. banksi*, or a yet unlocalized species.

Remarks.—Since a specimen of this species was figured in at least one copy of Martyn's *Universal Conchologist* (see Walker, loc. cit.), a work presumably completed before 1790, and was apparently represented in collections of the early 1800's, it seems probable that the material dates from one of the pre-1790 exploratory voyages, possibly the first voyage of Cook, for we know that Sir Joseph Banks

collected an *Amphidromus* on Pulau Panaitan on January 5, 1771. Butot (1955, pp. 125-126) pointed out that *Amphidromus aureus* of Martyn, 1784, described as having been collected on Pulau Panaitan, is quite different from any shell found on that island. The species Butot collected, he described as *A. banksi*. It is strikingly similar to the figures of *virescens*. Probably the original specimens of *virescens* came from Banks' collection and the *aureus* of Martyn had a wrong locality. We prefer to use the name *banksi* rather than attempt to guess the identity of *virescens* from illustrations.

virescens von Martens, 1867 (not Swainson, 1822)

Bulimus furcillatus var. *virescens* von Martens, 1867, Ostas. Landschn., p. 358, pl. 21, fig. 3—Rogodjampi, Java.

Amphidromus furcillatus (Mousson), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 76; Pilsbry, 1900, Man. Conch., (2), 13: 217, pl. 66, fig. 40.

Amphidromus furcillatus var. *virescens* (von Martens), van Benthem Jutting, 1950, Treubia, 20: 495.

Lectotype.—Location unknown.

Distribution.—Java.

Classification.—A color phase of *Amphidromus furcillatus*.

viridis von Moellendorff, 1898

Amphidromus haematostoma forma *viridis* von Moellendorff, 1898, Nachr. Malak. Gesell., 30: 74-75—Boloven Plateau, Annam; Pilsbry, 1900, Man. Conch., (2), 13: 183; Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, fig. 4.

Lectotype.—Senckenberg Museum No. 7559.

Distribution.—Known only from the type collection.

Classification.—A color phase of *Amphidromus haematostomus*.

viridistriata Rolle, 1903

Amphidromus inconstans var. *gracilis* forma *viridistriata* Rolle, 1903, Nachr. Malak. Gesell., 35: 157—Roma Island, Timor; Zilch, 1953, Arch. f. Mollusk., 82: 132, pl. 22, fig. 7.

Lectotype.—Senckenberg Museum No. 7569a.

Distribution.—Known only from the type locality.

Classification.—A variant of *Amphidromus inconstans*.

viridoflavus Bartsch, 1917

Amphidromus entobaptus *viridoflavus* Bartsch, 1917, U. S. Nat. Mus., Bull. 100, 1, pt. 1, p. 29, pl. 14, figs. 1-3—Malubutglubut Island, Calamianes Archipelago, Philippine Islands.

Holotype.—United States National Museum No. 215600.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus entobaptus contractus*.

waterstraati Rolle, 1903

Amphidromus waterstraati Rolle, 1903, Nachr. Malak. Gesell., 35: 156-157—
Palawan, Philippine Islands.

Holotype.—Location unknown.

Distribution.—Known only from the type specimen.

Classification.—Uncertain (see p. 592).

webbi Fulton, 1907

Amphidromus webbi Fulton, 1907, Ann. Mag. Nat. Hist., (7), 19: 152-153, pl. 9,
fig. 8—Nias Island, Sumatra; van Benthem Jutting, 1935, Misc. Zool.,
Sumatrana, 89: 3; Laidlaw, 1954, Zool. Meded., 33: 76-80.

Holotype.—British Museum (Natural History) No. 1907.5.3.125.

Distribution.—Nias, Simalur, Pulau Babi, Pulau Lekon, and the
Mentawi Islands, Sumatra.

Classification.—*Amphidromus webbi webbi*.

webbi Bartsch, 1919 (not Fulton, 1907)

Amphidromus maculiferus webbi Bartsch, 1919, Proc. Biol. Soc. Washington, 32:
183—Cabacan, Cotabato, Mindanao, Philippine Islands.

Holotype.—United States National Museum No. 217035.

Distribution.—Known only from the type locality.

Classification.—A form of *Amphidromus maculiferus buluanensis*.

Remarks.—The substitute name *bartschi* is proposed (p. 548) to
replace preoccupied *webbi* Bartsch.

weberi Bartsch, 1918

Amphidromus versicolor weberi Bartsch, 1918, Jour. Washington Acad. Sci., 8:
366—Mantangule Island, Palawan Passage, Philippine Islands.

Holotype.—United States National Museum No. 218422.

Distribution.—Known only from the type locality.

Classification.—A synonym of *Amphidromus quadrasi quadrasi*
var. *versicolor*.

wetaranus Haas, 1912

Amphidromus wetaranus Haas, 1912, Ann. Mag. Nat. Hist., (8), 10: 415—
Tihoe, Wetar Island, Timor; Zilch, 1953, Arch. f. Mollusk., 82: 134, pl. 23,
fig. 21.

Holotype.—Senckenberg Museum No. 5893.

Distribution.—Known only from the type locality.

Classification.—*Amphidromus inconstans wetaranus*.

weyersi Dautzenberg, 1901

Amphidromus weyersi Dautzenberg, 1901, Mem. Soc. Roy. Zool. Malac. Belgique, 36: 4, fig. 1—Sambas, northwest Borneo.

Holotype.—Location unknown.

Distribution.—Known only from the type material.

Classification.—*Amphidromus adamsii weyersi*.

winteri Pfeiffer, 1849

Bulimus winteri Pfeiffer, 1849, Zeits. Malak., 6: 135—Java; Pfeiffer, 1850, Syst. Conch. Cab., 1, 13, (1), p. 134, pl. 40, figs. 3-4; von Martens, 1867, Ostas. Landschn., p. 353, pl. 20, figs. 4, 10, pl. 21, fig. 10.

Amphidromus winteri (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 74; Pilsbry, 1900, Man. Conch., (2), 13: 137, pl. 48, figs. 13-18; Gude, 1903, Jour. Malac., 10: 55; Leschke, 1914, Mitt. Naturh. Mus. Hamburg, 31: 234; Paravicini, 1935, Arch. f. Mollusk., 67: 173; Adam and Leloup, 1939, Mem. Mus. Roy. Nat. Hist. Belgique, hors ser., 2, (20), p. 32; van Benthem Jutting, 1950, Treubia, 20: 485-486, fig. 95.

Holotype.—Location unknown.

Distribution.—Java.

Classification.—*Amphidromus winteri*.

xiengensis Morlet, 1891

Amphidromus xiengensis Morlet, 1891, Jour. de Conch., 39: 27, 232, 240-241, pl. 5, fig. 4—Xieng-Moi Plateau, Laos; Pilsbry, 1900, Man. Conch., (2), 13: 194-195, pl. 63, figs. 75-76; Dautzenberg and Fischer, 1906, Jour. de Conch., 53: 364-365—Phan-Ran, Annam.

Amphidromus porcellanus var. *xiengensis* Morlet, Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 79.

Amphidromus contrarius xiengensis Morlet, Rensch, 1932, Zool. Jahrb., Syst., 63: 96.

Holotype.—Laboratoire du Journal de Conchyliologique, Paris.

Distribution.—Laos and Cambodia.

Classification.—*Amphidromus xiengensis*.

zebra van Hasselt, 1823 (not Bruguière, 1792)

Bulimus zebra van Hasselt, 1823, Algemene Konst en letterbode, p. 233 (*nomen nudum*).

Remarks.—An unpublished plate in the Berlin Museum shows that this referred to *Amphidromus porcellanus* (see Pilsbry, 1900, p. 201).

zebrinus Pfeiffer, 1861

Bulimus zebrinus Pfeiffer, 1861, Proc. Zool. Soc. London, 1861: 194—Siam; Pfeiffer, 1861, Nov. Conch., 2: 172, pl. 46, figs. 9-10.

Amphidromus zebrinus (Pfeiffer), Fulton, 1896, Ann. Mag. Nat. Hist., (6), 17: 81; Pilsbry, 1900, Man. Conch., (2), 13: 199, pl. 63, figs. 90-91.

Lectotype.—British Museum (Natural History) No. 19601439.

Distribution.—Thailand.

Classification.—Status uncertain. May be a synonym of *Amphidromus areolatus*, described at the same time and with the same locality.

oculata von Martens, 1867 (see p. 645)

Bulimus leucoxanthus var. *oculata* von Martens, 1867, Ostas. Landschn., p. 349, pl. 20, fig. 12—locality not given.

Amphidromus aureus leucoxanthus var. *oculata* (von Martens), Pilsbry, 1900, Man. Conch., (2), 13: 163.

Holotype.—Location unknown.

Classification.—The black-tipped color phase of *Amphidromus atricallosus* var. *leucoxanthus*.

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